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ABSTRACT

Presented is the competency-based teacher training manual for Project ACTIVE (All Children Totally Involved in Exercising), a program designed for training educators to organize, conduct, and evaluate individualized-personalized physical education programs for handicapped students, prekindergarten through high school. The first three chapters cover features of a successful competency-based training program, an outline for a teacher inservice program, and PERT (Program Evaluation and Review Technique) network guidelines for program development (including program activity checklists covering various handicapping conditions). The remaining eight chapters provide information on definitions, behavioral objectives, testing, assessment, prescription, evaluation, and student learning experiences relating to the following exceptionalities: low physical vitality, low motor ability, postural abnormalities, nutritional deficiencies, mental retardation and learning disabilities, breathing problems, motor disabilities or limitations, and communication disorders. Appendixes include a list of supply and equipment needs, medical excuse and master scheduling forms, and a prekindergarten screening test. (SBH)

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DEVELOPMENTAL AND ADAPTED PHYSICAL EDUCATION

A COMPETENCY-BASED TEACHER TRAINING MANUAL

Thomas M. Vodola, Ed.D.
Project Director

Project Active: All Children Totally InVolved Exercising

Project Number: 74-341, Title 111, E.S.E.A

MEMO FROM THE COMMISSIONER

"On behalf of the Department of Education, State of New Jersey, I wish to bring Project ACTIVE to the attention of educators throughout the nation. The program has made a significant contribution to both physical and special education in New Jersey and thus will be of interest to both educators and parents."

Fred G. Burke

Dr. Fred G. Burke
Commissioner of Education
New Jersey Department of Education

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TOWNSHIP OF OCEAN SCHOOL DISTRICT
1975

PARTICIPATING SCHOOL DISTRICTS/AGENCIES

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Asbury Park	Rangs Avenue, Bond Street
Budd Lake	Sands Shore Road School
Deal	Deal Elementary
Dumont	Selzer School, Boro Hall
Englishtown	Manalapan—English Taylor Mills
Farmingdale	Griebling School
Flemington	Hunterdon Central High
Glenridge	Central School
Hammonton	Ancora Psychiatric Hospital
Hazlet	Hazlet Township School
Hoboken	D.S. Kealy School
Holmdel	Holmdel Township School
Irvington	Union Avenue School
Jersey City	P.S. 32, St. Joseph's School for the Blind, Bureau of Special Services
Kinnelon	Stony Brook School, Pearl R. Miller
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Middlesex	Watchung School
Millington	Bonnie Brae School for Boys
Monroeville	Upper Pittsgrove Township Schools
Morris Hills	Morris Hills High School
Newark	Chancellor Avenue School
New Lisbon	New Lisbon State School
Old Bridge	Public Schools, Madison Township Recreation Department
Orange	Cleveland School
Paramus	Parkway School, Paramus Catholic High School
Pomptain Plains	Pequannock Township Schools
Princeton	West Windsor-Plainsboro Regional
Red Bank	Red Bank Primary Schools, Red Bank Catholic High School, St. James Elementary, Monmouth Unit N.J.A.R.C.
Scotch Plains	Fanwood School
Seabrook	Seabrook Schools
Shipbottom	Long Beach Island Schools
Stanhope	Byram Intermediate School
Township of Ocean	Oakhurst School, Ocean Township High School, Ocean Township Elementary School, Wayside School, Wanamassa School, Oakhurst Methodist
Upper Montclair	Montclair State College, Montclair Summer Learning Disabilities Day Camp
Wall Township	Central School
Wayne	A.P. Terhune, Eastern Christian Children's Retreat
West Long Branch	Wall Street School, Frank Antonides School
Woodbridge Township	Glen Cove School, Woodbridge Township Schools
West Long Branch	Monmouth College Campus for Exceptional Children
Eatontown	NJACLD, Monmouth County Unit, Freehold, Hazlet, West Belmar,

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PREFACE

The development of the Project ACTIVE manual, *Developmental and Adapted Physical Education: A Competency-Based Teacher Training Manual* was a cooperative effort of the Township of Ocean School District and the Office of Program Development, Division of Research, Planning, and Evaluation/Field Services, Department of Education, State of New Jersey.

In 1974, the manual was validated by the standards and guidelines of the United States Office of Education as successful, cost-effective, and exportable. As a result the program is now funded through the New Jersey Elementary and Secondary Education Act, Title III program to offer interested educators the training and materials required for its replication. This manual was prepared as part of the program's dissemination effort.

The purpose of Title III is to encourage the development and dissemination of innovative programs which offer imaginative solutions to educational problems. Project ACTIVE achieved this purpose by disseminating its innovative program to 181 teachers through 12 regional workshops. During the 1974-75 school year 12 additional workshops, involving 250-300 teachers, will be conducted. Further, as of June 1974, 28 school districts and agencies in the State of New Jersey have adopted or adapted some aspect of the individualized physical education program in accordance with the educational needs of their districts—involving more than 3,000 pupils. By June 1975, Project ACTIVE will probably have had an impact upon 6,000 children.

This manual has been prepared as one of the components of the Project ACTIVE Teacher Training Model Kit. Other sections of the Model Kit which are available to those interested in adopting or adapting the project's individualized instructional concept are cited below.

1. Developmental Physical Education:[1] Low Motor Ability*
2. Developmental Physical Education: Low Physical Vitality
3. Adapted Physical Education: Postural Abnormalities
4. Adapted Physical Education: Nutritional Deficiencies
5. Adapted Physical Education: Auditorily/Visually Handicapped
6. Adapted Physical Education: Motor Disabilities/Limitations
7. Adapted Physical Education: Breathing Problems

The manual, coded with an asterisk, (*) has been validated for national dissemination. The other manuals are only available to districts and agencies in New Jersey who are conducting pilot studies.

For additional information regarding the teacher training manuals, or other awareness materials, the reader is requested to contact:

Dr. Thomas M. Vodola, Director
Project ACTIVE
Township of Ocean School District
Dow Avenue
Oakhurst, New Jersey 07755

[1]Developmental Physical Education is defined as that aspect of the physical education program which addresses itself to the provision of enriched physical activities for those students who are below normal in terms of physical fitness, motor performance, and/or perceptual-motor performance.

ACKNOWLEDGEMENTS

The manual, *Developmental and Adapted Physical Education: A Competency-Based Teacher Training Manual* is based on the Developmental and Adapted (D&A) Program developed by the Project Director in the Township of Ocean School District, Oakhurst, N.J.

Appreciation is expressed to the Township of Ocean Board of Education, Superintendent of Schools the D&A Council, teachers, students, and parents for their total commitment to the program. Special appreciation is accorded to the Township of Ocean Physical Education Department for their unstinting support and effort.

To Prentice-Hall, Inc., a special vote of thanks for granting the Project Director permission to include materials from his text, *Individualized Physical Education Program for the Handicapped Child*.

Sincere appreciation is also accorded to the Advisory Council members who assisted in the reviewing and editing process: Mr. Sal Abitanta, Consultant, New Jersey State Department of Education; Dr. David Bilowit, Professor, Kean College of New Jersey; Mrs. Edwina M. Crystal, School Psychologist, Township of Ocean School District; Mr. Al Daniel, Coordinator, Developmental Physical Education, Cherry Hill School District; Mr. George Gerstle, Assistant Professor, Glassboro State College; Mr. Paul Porado, Program Director, Office of Special Services, N.J. Department of Education; and Dr. Marion Rogers,* Professor, Glassboro State College. Also special thanks to the project consultants: Miles Drake, M.D. representative of the New Jersey Chapter of the American Academy of Pediatrics; Dr. Raymond Weiss, Professor, Department of Health, Physical Education and Recreation, New York University; and Dr. Julian U. Stein, Director, Program for the Handicapped, American Association of Health, Physical Education and Recreation, Washington, D.C.

To Mrs. Jean Harmer, Mrs. Mary Kesperis and Mrs. Dorothy Smith, gratitude and appreciation for their painstaking devotion to the development of the intermediate "product."

Grateful appreciation is also extended to the New Jersey State Department of Education and the Title III staff members for their continued assistance and support.

Special thanks are given to the Project ACTIVE cadre team, for the many hours they devoted to assisting in the restructuring of the "final" product. The synthesizing team consisted of: Mrs. F. June Graf, Livingston School District; Mr. Robert Fraser, Wayne Township Public Schools; Mr. Robert Ekblom, Madison Township Public Schools; Mr. Thomas Cicalese, Morris Hills Regional District; Mr. Tim Sullivan, Montclair State College; Mr. G. "Buzz" Buzzelli, Monmouth College; Mr. Roy Lipoti, New Lisbon State School, Garden State School District; Mr. Edward Korzun, Orange Public School System; Mr. Thomas Pagano, Township of Ocean School District; Mr. Lawrence A. Guarino, Newark School District; Mr. Al Daniel, Cherry Hill School District; and Dr. David Bilowit, Kean College of New Jersey. Credit for the art

*Retired as of July, 1973

work is accorded to Mr. Athan Anest, Wall Township School District.

To the many authors and publishers who permitted the use of their materials in the manual, my sincere appreciation.

Finally, to Emil Praksta,* a representative of the South Jersey Educational Improvement Center, the co-director of this project and a personal friend, my sincere appreciation for his constant stimulation, support, and criticism of all materials.

A final note: Although the aforementioned "team" made many constructive suggestions which were included in the manual, I accept full responsibility for the final product and any criticisms thereof, because all final decisions were a reflection of my personal philosophy.

Thomas M. Vodola, Ed.D.
Title III Project Director

*Recently deceased

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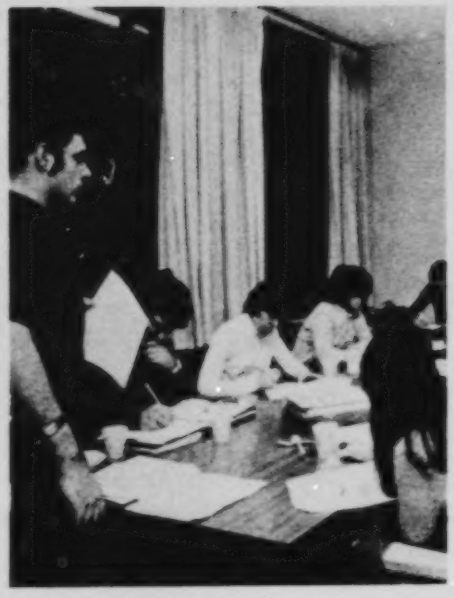
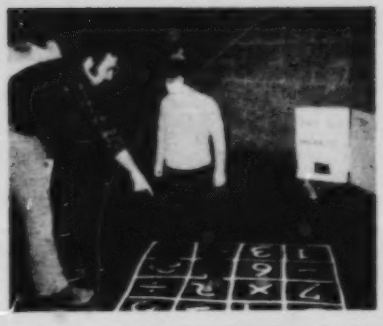
TEACHER TRAINING





CHAPTER ONE

COMPETENCY-BASED INSTRUCTION

INTRODUCTION

Overview

Developmental and Adapted Physical Education: A Competency-Based Teacher Training Manual has been developed to serve two purposes:[1]

1. To provide a model for training physical educators, special educators, and recreation teachers to achieve those minimal competencies necessary to implement an individualized physical education program for children, pre-kindergarten through grade 12, who manifest any type of handicapping condition.
2. To provide practitioners in the field, so trained, with those skills, strategies, and materials necessary to implement a comprehensive program for all handicapped children.

The program presented has been validated according to the standards and guidelines of the United States Office of Education as innovative, successful, cost-effective, and exportable. The effects of the competency-based teacher training program on physical educators, special educators, and recreation teachers were assessed by conducting studies at seven regional training sites in New Jersey. The initial goal stated that at the end of the training program all participants would demonstrate at least eighty per cent of the competencies, i.e., 20 of 25. A comparision of pre-and post-test results revealed that all subjects attained the minimal eighty percent score. The mean competency achievement for the eighty participants was 23. Thus, it was concluded:

> The teacher competency training model is an effective method of providing graduate and undergraduate students in physical education, special education, and recreation with those minimal competencies necessary to implement an individualized Developmental and Adapted Physical Education Program.

The competency-based approach for teaching physical education skills is hypothetically superior to other traditional approaches because it focuses the learning process on the specific skills to be acquired and it provides the teacher with viable, meaningful practicum experiences.

The manual has been divided into two sections: Section One provides guidelines for inservice programming; and Section Two deals with the "specifics" of program planning and implementation. The remaining pages of Chapter One focus on the component parts of the Project ACTIVE competency-based teaching process.

Competency-Based Process

The Project ACTIVE Teacher Training Program is unique in that the entire training program focuses on acquisition and demonstration of specific skills that are necessary for effectively teaching children with a variety of handicapping conditions.

To maximize teacher attainment of all competencies, the entire training program is highly structured and includes:

A. The administration of a pre-course inventory during the first session.
B. A lecture regarding the theory and rationale underlying a specific competency.
C. A demonstration of the competency.
D. Trainee performance of the competency (under

[1]The term "Developmental and Adapted Physical Education" was originated by H. Harrison Clarke and David H. Clarke, *Developmental and Adapted Physical Education*, p. 20.

the supervision of the master teacher).

E. Trainer-trainee discussion regarding problems encountered and potential alternatives.
F. Trainee performance of the competency until it is properly internalized.
G. The administration of a post-course inventory as soon as the trainee has acquired the necessary competencies.

Pre-Course Inventory

The purpose of the Pre-Course Inventory is to gather baseline information regarding the proficiencies of each trainee so that the subsequent instructional sessions can be adjusted according to individual needs. Further, the initial information provided establishes a means of assessing the effectiveness of the instructional program at the termination of the program (i.e., Post-Course Inventory–Pre-Course Inventory). The items in the Inventory are cited below.

Teacher Performance Chart

The Teacher:

1. Converts raw scores to percentile scores.
2. Converts percentiles to a composite stanine score.
3. Converts stanine scores to an individualized time prescription.
4. Schedules a subject for developmental and adapted Physical Education.
5. Computes a subject's time prescription on the basis of standardized scores.
6. Identifies a subject's primary and secondary somatotyping characteristics.
7. Prescribes a physical activity program based on a subject's somatotype.
8. Prescribes motor ability tasks and activities on the basis of the problem(s) manifested.
9. Administers the New York Posture Screening Test.
10. Identifies a posture problem and prescribes exercises.
11. Distinguishes between a potential "structural" or "functional" curvature of the spine.
12. Determines a subject's "predicted" body weight.
13. Computes a subject's Nutritional Index.
14. Determines the Daily Caloric Intake necessary to maintain a particular body weight.
15. Determines the Daily Caloric Intake and physical activity needs to gain or lose weight.
16. Demonstrates the application of the "tension control" principle.
17. Discerns a potential visual response problem from a visuo-motor response problem.
18. Demonstrates a task that incorporates perceptual, motor, cognitive and academic skills.
19. Measures a subject's vital capacity by using a dry spirometer.
20. Measures a subject's vital capacity by using the "hissing" test.
21. Determines a subject's degree of flexion and extension.
22. Determines the Strength Decrement Index of a muscle or a muscle group.
23. Determines his proper crutch length.
24. Demonstrates a proper crutch-walking gait.
25. Demonstrates one technique for assessing a blind subject's kinesthetic sense.

Lecture

Prior to the practicum experience phase of the program, the teacher trainer delivers a lecture that provides necessary background information and research related to the competency that is to be taught. The purpose of the presentation is to be sure that the trainee possesses all of the necessary preliminary information.

The time devoted to the lecture will vary according to the previous training of the course participants. For example, if the instructor is presenting information related to postural abnormalities to a group of physical educators, he might quickly review the anatomical aspects of the presentation. On the other hand, if addressing special educators, he would want to define and explain such terms as "thoracic" and "lumbar" curves, and the like.

Fig. 1-1 Lecture

Competency Demonstration

The teacher trainer demonstrates the specific skill that is to be learned. He may use one of the trainees as the subject, or one of the children provided for the practicum experience. (The former choice has been found preferable.) It is recommended that trainees test one another during this phase of the process to resolve any questions they have prior to working with the children.

Fig. 1-2 Competency Demonstration

Trainee Performance Of The Competency

The "key" to competency-based teaching and learning is the immediate application of the skill that has been learned. An essential ingredient of this aspect of the program is proper "feedback." The trainee will perform the task based on his impressions of the demonstration. He may well have misunderstood or misapplied the skill or strategy. To avoid improper skill acquisition, the "master teacher," or preferably two, supervise all trainees during all practice sessions. Proper supervision means that the trainer: constantly observe teacher performance; ask questions regarding why the trainee applied a certain technique; correct inappropriate application of skills and strategies (providing the rationale simultaneously); and reinforce competencies that are properly administered.

Finally, a word regarding the importance of trainee observation during the practice sessions. Often, pre-service and inservice training programs are conducted mechanically, (i.e., the teacher is taught a skill—the teacher applies the skill). This may be the recommended procedure when working with inanimate objects. However, children with individual feeling and emotions all respond differently to a given situation—thus the need for careful observation. An example may clarify the point. Many children when "screened" for posture problems will assume a rigid, artificial body position, perhaps because of the embarrassment of being partially disrobed. The skilled teacher will note such behavior and relax the child by talking in a friendly reassuring manner.

In order to develop the observational powers of the course participants, it is recommended that trainees be paired; the rationale: one member concentrates on skill application while the second carefully observes pupil performance. After a brief period, the members switch roles. At the conclusion of the training session, each "pair" discusses the performance of the child. This "pairing" strategy has been shown to improve the observational powers of the trainees involved.

Trainer-Trainee Discussion

Competency-based training requires constant interaction between the "master teacher" and the trainees, which can and should take place immediately after the initial field experience of the day. Discussion will usually evolve around problems encountered and suggested alternate strategies that may be applied.

Fig. 1-3 Trainee Performance

Internalization Of The Process

Regardless of the strategy utilized in a teaching and learning process, the objective can be achieved only if the material or skill to be learned is repeated again and again. Thus, for a trainee fully to develop a competency, it is recommended that he be provided as many field experiences as are necessary under varying conditions to ensure attainment of a high degree of proficiency.

Post-Course Inventory

Assessment of trainee performance is ascertained by readministration of the Pre-Course Inventory. Cognitive competency attainment should be evaluated during the last training session. Psychomotor competency attainment

should be evaluated during the training session in which the proficiency is achieved.

The rationale for the repeated use of the Pre-Course Inventory is in order. Whenever retesting is required, it is recommended that the tester use alternate forms of the instrument to control for any learning that may result from the initial testing. The same instrument could be used however, if the interactive effects between the pre- and post-test could be controlled. It is believed that the immediate removal of the Pre-Course Inventory after administration, the provision of absolutely no feedback regarding teacher performance, and the time interval (ten weeks) between pre- and post-inventories will minimize the interactive effects.

SUMMARY

To implement a successful competency-based training program, one must incorporate the following features:

1. State the specific competencies to be achieved in behavioral terms.
2. Administer a pre-test to determine the initial level of each trainee.
3. Provide a lecture which incorporates all essential background information for the competency that is to be practiced.
4. Demonstrate the competency that is to be achieved—preferably in a natural setting (i.e., the "master teacher" working with a child in an appropriate learning environment).
5. Provide ample time for the trainee to apply the skill in a practice setting.
6. Ensure constant supervision and feedback throughout the practice experience by the "master teacher."
7. Provide a discussion period for interaction between the trainer and trainee so that problems and alternate strategies can be discussed.
8. Expose the trainee to additional field experiences (until the competency is acquired.)
9. Administer a post-test to determine the competencies achieved.

CHAPTER TWO

OUTLINE FOR TEACHER INSERVICE PROGRAM

I. PHILOSOPHICAL CONSIDERATIONS

A. LECTURE

1. Value of Physical Activity for the Handicapped Child
   Definition of the term "handicapped."
   Enhancement of the child's self-concept.
   Acceptance by the peer group.
   Improvement in physical vitality and motor performance.
   Development of leisure time skill competencies.
   Amelioration, or elimination of handicapping conditions.
2. Classifying Students Non-Categorically
   Elimination of ambiguous, stigmatizing terminology.
   Prescriptions based on behavior(s) manifested.
3. Focusing on Abilities as Well as Disabilities
   Structure of instructional period.
   Selection of motivational activities.
4. Individualizing Instruction
   Review of research related to instructional grouping procedures.
   Format to be used for individualizing instruction:
   test/assess/prescribe/evaluate (TAPE)
5. Mandatory, Quasi-Mandatory, or Elective Scheduling

B. CLASSROOM AND LABORATORY PRACTICUM EXPERIENCE

1. Role-Playing
   Conversation with parent: explaining why her child should be scheduled in Developmental and Adapted physical education.
2. Observe one child during the practicum experience and keep a record of behaviors manifested. Reflect on types of physical activity to remedy or improve performance.

C. TEACHING COMPETENCIES TO BE STRESSED

1. Values of Physical Activity
   a. The teacher lists five values of physical activity and cites specific examples that relate to each value.
      Evaluation criteria: Physical activity values that are documented by at least two footnotes.
   b. The teacher prepares a one-page test battery using the format: test; assess; prescribe; and evaluate.
      Evaluative criteria: Referential documentation of TAPE.

D. ASSIGNMENTS FOR NEXT WEEK

1. Correspondence
   Write to: (on school stationery)
   J.A. Preston Corporation
   71 Fifth Avenue
   New York, New York 10003
   Requesting latest catalog and facility lay-out booklets.

   Dr. Julian U. Stein, Consultant
   Unit on Programs for the Handicapped
   A.A.H.P.E.R.
   1201 Sixteenth Street, N.W.
   Washington, D.C. 20036
   Requesting free materials that may be utilized to implement a comprehensive physical education and recreation program for the handicapped.
2. Longitudinal Study[1]
   Contact the Coordinator of Special Services in your district to identify and discuss a "classified" child who would benefit from an individualized program.
   Review his or her medical history and permanent record folder. Request added information from the school nurse and staff. Contact parent(s) and request

[1] All materials related to the longitudinal study are to be kept in a notebook and submitted at the last class meeting.

permission to schedule the child two days per week so that you can teach on a one-to-one basis.

3. Scheduling Students
   Acquire schedules of all self-contained classes of "classified" children and/or the schedules of ten "classified" children integrated in the regular program.
4. Facilities
   Review facilities in your school, or district to ascertain number of possible teaching stations (indicate dimensions of each area).

II. THE HANDICAPPED CHILD

A. LECTURE

1. Etiology of Handicapping Conditions
   Mental retardation.
   Cerebral palsy.
   Neurologically/perceptually impaired.
   Emotionally disturbed
   Orthopedic and postural deviation.
   Special health problems.
2. Behaviors Manifested
   Poor motor ability.
   Incoordination.
   Weakness and/or low vitality.
   Specific handicaps due to health problems (e.g., breathing problems due to allergy or cystic fibrosis).
   Inadequate or disturbed communications.
   Perceptual problems.

B. LABORATORY PRACTICUM EXPERIENCES

1. Work with a child on a one-to-one basis.
   Observe and identify handicapping conditions.
   Observe and identify behavior(s) manifested.

C. TEACHING COMPETENCIES TO BE STRESSED

1. The teacher cites three handicapping conditions manifested by the child he participated with.

Fig 2-1 One-to-One Basis

D. ASSIGNMENTS FOR NEXT WEEK

Review the following material related to next week's session:

1. Appendix 1-7
2. PERT networks related to organization and administration.

III. ORGANIZATION AND ADMINISTRATION

A. LECTURE

1. Forming a Policy-Making Council
   Recommend council members.
   Job descriptions of council members.
   Review and discuss sample council agenda and reports.
   Review and discuss D&A policies (refer to Appendix 1).
2. Scheduling Procedures
   "Block" scheduling.
   One day per week, plus the unrestricted program.
   Flexible scheduling.
   The restricted program in lieu of the unrestricted program.
   Unrestricted scheduling.
3. Supply, Equipment, and Facility Needs
   Supply needs (refer to Appendix 2 for a list of D&A supply needs).
   Equipment needs.
   Facility needs.
4. Forms Necessary for Program Implementation
   Teacher referral (refer to Appendix 3).
   Public relations letter, to family physician (refer to Appendix 4).
   Medical excuse (refer to Appendix 5).
   Master scheduling (refer to Appendix 6).
   Drop or add slip (refer to Appendix 7).
   Individual prescription card (refer to Chapter Four).
   Individual student folder.

B. CLASSROOM AND LABORATORY PRACTICUM EXPERIENCES

1. Role-Playing
   D&A council meeting.
2. Scheduling Students
   Schedule students in D&A for a "block of time" (more than one day per week), plus the unrestricted program.
   Schedule students in D&A one day per week, plus the unrestricted program.
   Schedule students in D&A flexibly; shuttling back and forth between the restricted and unrestricted program (on the basis of the physician's prescription).
   Schedule students in D&A in lieu of the unrestricted program.
3. Supply, Equipment, and Facility Needs
   Prepare a budget of supply and equipment needs for implementing a comprehensive program (refer to Table of Contents for handicapping conditions included in a comprehensive program).
   Prepare a list of teaching stations available in your school or district.
   Prepare a drawing of one station; include activity areas within the station (refer to Appendix 8 for an example).
4. Observe a Child; Note Handicapping Conditions
   Keep a record of behaviors manifested and types of physical activity you could implement to improve performance.

C. TEACHING COMPETENCIES TO BE STRESSED

1. Given a weekly schedule of ten elementary students, the teacher schedules the children in D&A, as a group, for two days per week, in addition to their participation in the unrestricted program. The schedule is to be structured so that the children do not miss the same classroom instructional period more than once a month.
2. Given a weekly schedule of ten high school students, the teacher schedules the students for two days per week, in addition to the unrestricted program. The schedule should be structured in a manner that permits each student to be flexibly shifted between the D&A and unrestricted program.

D. ASSIGNMENTS FOR NEXT WEEK

1. Physical Fitness and Motor Ability Test Data
   Bring raw data to class for a physical fitness, or motor ability test battery administered in your school or district, or other data if the aforementioned is not available.
2. Longitudinal Study
   Provide student with a variety of tasks and activities and keep an anecdotal record of his performance.
3. Teaching Model Kit
   Review materials related to individualizing instruction with particular emphasis on "somatotyping."

IV. INDIVIDUALIZING INSTRUCTION

A. LECTURE

1. Developing Percentile Norms
   Values and limitation of percentile norms.
   Utilization of "tally sheets" to compute percentiles (to be distributed).
   Utilization of tables of numbers (refer to Appendix 15).
2. Converting Percentiles to Stanine Scores and Index Scores

Fig 2-2 Plotting Student Profile Charts

   Computing component stanine scores.
   Computing composite stanine scores.
   Computing "low physical vitality" and "low motor ability" indices.
3. Plotting student profile charts (refer to Chapter Four).
4. Considering Body Structure
   Interrelationship of body structure and performance.
5. Assessing Performance Objectively and Subjectively
   Objective assessment: on the basis of raw score data, percentiles and stanines.
   Subjective assessment: on the basis of body structure and observation of performance.
6. Determining Time Prescriptions
   Devising practice, or time prescription on the basis of stanine score differential (refer to Chapter Four).
7. Prescribing Individualized Program
   Focusing on disabilities.
   Focusing on abilities.
   Focusing on activities that stress social interaction.
   Setting up a teaching station conducive to individualized instruction.
8. Evaluation
   Evaluating on the basis of achievement and improvement.

B. CLASSROOM AND LABORATORY EXPERIENCES

1. Developing Percentile Norms
   Compute percentiles for a physical fitness, or motor ability battery administered in your school or district.
2. Converting Percentile to Stanine Scores
   Compute component stanine scores for "A" above.
   Compute composite stanine score for "A" above.
   Utilize Index Formula: $\text{Index} = \frac{\text{composite stanine} \times 10}{\text{number of test items}}$
   to compute Physical Fitness or Motor Ability Indices.
   Determine "cut-off point" for Low Physical Vitality, or Low Motor Ability.
3. Plotting Student Profile Charts
   Record component stanine scores from "2" above on Profile Chart.
4. Determining Practice, or Time Prescriptions
   Prescribe time prescriptions for students who were identified as displaying Low Physical Vitality, or Low Motor Ability.
5. Prescribing Individualized Programs
   Make a drawing of a teaching station for the elementary or secondary level. Identify each area in terms of activities to be conducted and factors to be enhanced.
6. Body Structure
   Teachers to work in pairs identifying each other's primary and secondary somatotyping characteristics.
7. Observe a child; note handicapping conditions. Keep a record of behaviors manifested and types of physical activity you would implement to improve performance.

C. TEACHING COMPETENCIES TO BE STRESSED

1. Given the test battery scores of 100 students and the tally sheets to record the scores, the teacher computes the following percentile rank scores: 99, 97, 90, 80, 70, 65, 50, 40, 35, 30, 20, 10, 4, and 1.
   Evaluative criteria: Appendix 15, directions for use of the conversion tables.
2. Given the raw score data for ten subjects in a given population, percentile data and a stanine conversion sheet, the teacher computes: component stanine scores; the composite stanine score; and the Physical Vitality and Motor Ability Index scores.
   Evaluative criteria: percentile and stanine conversion sheets.
3. Time Prescriptions
   Information provided: a student achieved the following stanine scores:
   gross body coordination—6
   gross body balance—4
   eye and hand coordination—2
   eye and hand accuracy—2
   eye and foot accuracy—1
   Compute the time prescription for each factor (utilizing the Time Prescription Chart in Chapter Four).
   Evaluative criteria: time prescription chart directions.
4. Body Structure
   The teacher identifies the primary and secondary somatotyping characteristics of a subject. (Refer to Appendix 9 for descriptive somatotyping material.)

D. ASSIGNMENTS FOR NEXT WEEK

1. Longitudinal Study
   Continue with student's program. Focus tasks on the basis of the subject's abilities and interests.
2. Teaching Model Kit.
   Review materials and PERT networks related to Low Physical Vitality.

V. DEVELOPMENTAL ACTIVITIES PROGRAM: LOW PHYSICAL VITALITY

A. LECTURE

1. Low Physical Vitality
   Factors to be considered in developing a test battery.
   Township of Ocean Physical Fitness Test Battery (refer to Chapter Four for test form and directions).
   Test administration.
   Assessment procedures.
   Prescriptive procedures.
   Evaluative procedures.
   Physical fitness resource exercises and activities (refer to Chapter Four).

B. LABORATORY PRACTICUM EXPERIENCE

1. Low Physical Vitality
   Administer Physical Fitness Test Battery to one student.
   Compute stanine scores and Physical Fitness Index (percentiles to be provided) for raw scores attained via test battery administration.
   Identify primary and secondary body structure characteristics of a subject.
   Prepare individual folder.
   Prepare individual profile sheet.
   Assess subject's performance—objectively and subjectively.
   Determine individualized time prescription to ameliorate or eliminate disability—fifteen-minute time duration.

Prepare a list of tasks and activities that focus on abilities.
Record student's prescription on individualized card (Chapter Four).
Implement thirty-minute individualized program for one subject, record achievement on each task.

C. TEACHING COMPETENCIES TO BE STRESSED

1. The teacher administers the Township of Ocean Physical Fitness Test Battery.
   Evaluative criteria: test directions located in Chapter Four.
2. The teacher names, demonstrates, and implements tasks and activities for the student who is primarily: an endomorph; mesomorph; and ectomorph.
   Evaluative criteria: material in Chapter Seven.
3. The teacher designs an alternate physical fitness test battery that meets the following criteria: includes test items to assess arm strength, abdominal strength, leg strength and cardiorespiratory endurance; requires supply and equipment items that are available in the typical physical education department; indicates reliability coefficients of .75, or better; and discriminates among student abilities.
   Evaluative criteria: specific reference sources cited.

D. ASSIGNMENTS FOR NEXT WEEK

1. Low Motor Ability
   Review motor ability research to identify gross body coordination, gross body balance, eye and hand coordination, eye and hand accuracy, and eye and foot accuracy test items which have a reliability coefficent of .75, or better.
2. Longitudinal Study
   Administer Township of Ocean Physical Fitness Test Battery (modified according to the subject's handicapping condition). Keep a record of scores.
   Prescribe and implement tasks and exercises to improve fitness. (Use normative data provided in class to determine individual time prescriptions.)
3. Teaching Model Kit
   Review materials and PERT networks related to Low Motor Ability.

Fig. 2-3 Administer Physical Fitness Test

VI. DEVELOPMENTAL ACTIVITIES PROGRAM: LOW MOTOR ABILITY

A. LECTURE

1. Low Motor Ability
   Test administration and directions (refer to Chapter Five).
   Assessment procedures.
   Prescriptive procedures.
   Evaluative procedures.
   Motor ability resource tasks and activities (refer to Chapter Five).

B. LABORATORY PRACTICUM EXPERIENCES

1. Low Motor Ability
   Administer Motor Ability Test Battery to one student.
   Compute stanine scores and Motor Ability Index (percentiles to be provided), for raw scores attained via test battery administration.
   Identify primary and secondary body structure characteristics of the subject.
   Prepare individual profile sheet.
   Determine individualized time prescriptions that focus disabilities.
   Prepare a list of tasks and activities that focus on abilities.
   Record student's prescription on individualized prescription card.
   Implement thirty-minute program.
   Design an alternate motor ability test battery.

C. TEACHING COMPETENCIES TO BE STRESSED

1. The teacher administers the Township of Ocean Motor Ability Test Battery.

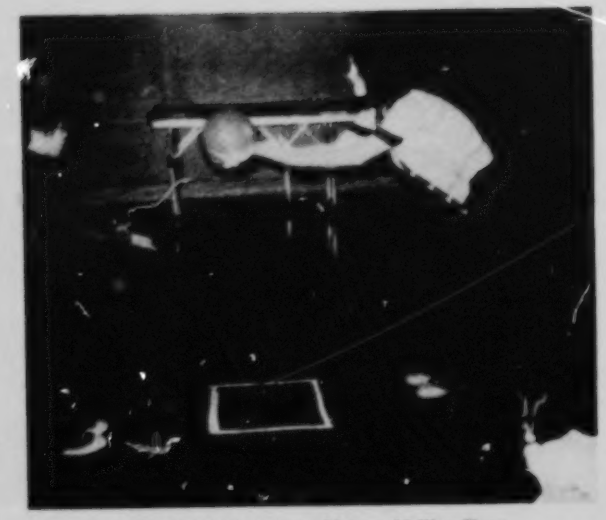


Fig. 2-4 Administer Motor Ability Test

Evaluative criteria: test directions in Chapter Five.

2. The teacher names, demonstrates, and teaches a task or activity that will ameliorate or eliminate each of the following motor performance problems: gross body coordination; gross body balance, eye and hand coordination; eye and hand accuracy; and eye and foot accuracy.
   Evaluative criteria: reference source material researched the previous week.
3. The teacher designs an alternate motor ability test battery that meets the following criteria: includes test items to assess the motor ability factors cited in number 2; requires supply and equipment items that are available in the typical physical education or recreation department; and indicates item reliability coefficient of .75, or better.
   Evaluative criteria: source(s) of reference investigated via the previous week's assignment.

D. ASSIGNMENTS FOR NEXT WEEK

1. Longitudinal Study
   Administer the Township of Ocean Motor Ability Test (modified according to the subject's handicapping condition). Keep a record of scores. Prescribe and implement tasks and motor activities to improve fitness. Use normative data provided in class to determine individual time prescription.
2. Teaching Model Kit
   Review materials and PERT networks related to Postural Abnormalities and Nutritional Deficiencies.

VII. ADAPTED ACTIVITIES PROGRAM
POSTURAL ABNORMALITIES and NUTRITIONAL DEFICIENCIES

A. LECTURE

1. Postural Abnormalities
   Terminology: posture and body mechanics.
   New York Posture Rating Test (refer to Chapter Six).
   Physician's Posture Examination Form (refer to Chapter Six).
   Lateral deviations.
   Anterior-posterior deviations.
   Staff screening procedure.
   Family or school physician referral procedure.
   Construction of posture grid.
   Exercises to ameliorate or eliminate abnormalities.
2. Nutritional Deficiencies
   Family or school physician referral procedure.
   Misconceptions related to physical activity and dieting, and their effects on body weight.
   Overweight-obesity; clarification of terms.
   Family or school physician referral procedure.
   Weight control program.

B. LABORATORY PRACTICUM EXPERIENCES

1. Postural Abnormalities
   Screen posture via modified New York Posture Screening Test.
   Identify "structural" and "function" problems.
   Measure leg length.
   Measure scapulae displacement
   Assess static and dynamic posture.
   Prepare a prescriptive program based on medical referral.
   Implement posture improvement program.
2. Nutritional Deficiencies
   Determine "true" and "predicted" body weight.
   Determine nutritional index.
   Measure adipose tissue—skinfold calipers.
   Measure muscle girth—measuring tape.
   Determine caloric needs to sustain present weight.
   Determine caloric needs to lose a half-pound per week.
   Determine activity needs to lose a half-pound per week.
   Prepare Weight Motivational Chart (refer to Chapter Seven).
   Assess performance needs.
   Prepare a prescriptive program based on medical referral.
   Implement Weight Control Program.

C, TEACHING COMPETENCIES TO BE STRESSED

1. Postural Abnormalities
   a. The teacher administers the modified New York Posture Screening Test to assess static and dynamic posture.
      Evaluative criteria: discerning anterior-posterior and lateral deviations on a 7-4-1 basis.
   b. The teacher distinguishes between potential "functional" and "structural" curvatures of the spine.

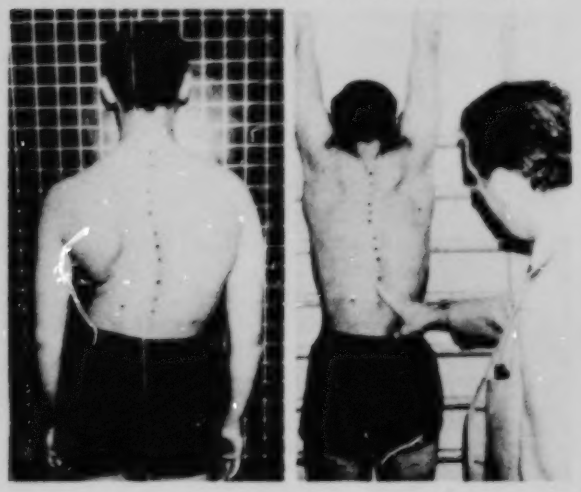


Fig. 2-5 Structural or Functional Curve?

      Evaluative criteria: if the curvature is "functional," it will disappear when the subject suspends body weight from an overhead ladder or stall bar.
   c. The teacher accurately measures leg length and scapulae displacement, (scoliotic subjects).
      Evaluative criteria: leg length—anterior superior spine of the ilium to the internal malleolus; scapulae displacement—inner border of scapulae to nearest vertebrae (horizontal plane). Note: Leg measurements are to be taken with the subject lying in a supine position.
   d. The teacher prescribes and implements exercises on the basis of the medical referral, posture screening, and his subjective assessment.
      Evaluative criteria: four points—two exercises; one point—four exercises (exercises listed in Chapter Six).
2. Nutritional Deficiencies
   a. The teacher determines a student's "true" weight and "predicted" weight via use of a stadiometer, wooden calipers and proper weight chart.
      Evaluative criteria: Pryor Width-Weight Tables.[1]
      Note: The width-weight tables and directions are located in the last section of Chapter Seven.
   b. Using the information provided below, the teacher determines the subject's correct Nutritional Index (NI).
      true weight (TW) =230 lbs.
      predicted weight (PW) = 200 lbs. $NI = \frac{TW-PW}{PW} \times 100$
      Evaluative criteria: correct application of formula.
   c. Using the information provided below, the teacher determines the subject's caloric needs to sustain his present weight, and to lose a half-pound per week.
      Evaluative criteria: twenty-five calorie tolerance limit.
      true weight = 140 lbs.
      calories expended for daily activities = 500 calories.
      3500 calories = 1 lb.
      Daily Caloric Intake (DCI)[2]=1 x 24 x body weight in kilograms (2.2 lbs. = kilogram) +calories expended for daily activity + ten per cent of total calories (to sustain assimilation and digestion).
   d. The teacher prescribes an activity program that will result in the subject's losing or gaining a half-pound per week.
      Evaluative criteria: energy expenditure chart, in Chapter Seven.

D. ASSIGNMENTS FOR NEXT WEEK

1. Mental Retardation or Learning Disabilities
   Attend a Child Study Team Meeting and/or review folder of one "Team" meeting.
   List the child's problem(s) (without name).
2. Longitudinal Study
   Screen subject for posture problems; determine Nutritional Index.
   Keep records.
   Refer to family or school physician for medical examination, if indicated.
   Follow-up with program, if medically approved.
3. Teaching Model Kit
   Review materials and PERT networks related to Mental Retardation or Learning Disabilities.

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[1] Helen Pryor, *Width-Weight Tables*, 15 pp.

[2] L. Jean Bogert, *Nutrition and Physical Fitness*, p. 64.

VIII. ADAPTED ACTIVITIES PROGRAM
MENTAL RETARDATION or LEARNING DISABILITIES

A. LECTURE

1. Mental Retardation or Learning Disabilities
   Child Study Team referral procedure.
   Suggested definitions.
   Teaching based on the behavior manifested.
   Perceptual-Motor Theory.
   Motor, cognitive and academic achievement.

Fig. 2-6 Motor-Cognitive Involvement

   Child Study team involvement and referral procedure.
   Planning an individualized program.
   Administration of physical fitness and perceptual-motor test batteries.
   Activities to ameliorate or eliminate psychological problems.
   Hyperactivity.
   Perseveration.
   Distractibility.
   Dissociation.
   A negative self-concept.
   Jacobson's Theory of Relaxation.[1]

B. LABORATORY PRACTICUM EXPERIENCES

1. Mental Retardation or Learning Disabilities
   Devise and teach a motor-cognitive activity that includes the following:
   Auditory discrimination.
   Visual discrimination.
   Tactile discrimination.
   Kinesthesis.
   Verbalization.
   Decision-making.
   Devise and teach one task to distinguish a perceptual response problem from a motor response problem.
   Administer Jacobson's Relaxation Exercises.
   Devise and teach a motor-cognitive activity that will enhance the development of a reading, or mathematics skill.

C. TEACHING COMPETENCIES TO BE STRESSED

1. Mental Retardation or Learning Disabilities
   a. Given a neurologically-impaired child who is hyperactive, the teacher designs, demonstrates and implements one task to decrease tetanic contractions of the musculature.
      Evaluative criteria: material to be distributed in class.
   b. The teacher demonstrates those personalized instructional techniques that aid in the elimination of a child's negative self-concept.
      Evaluative criteria: referring to the child by his or her first name; structuring the degree of task difficulty so that success is attained; providing experiences that focus on the child's abilities; and utilizing immediate, positive reinforcement.
   c. Given a child with a perceptual-motor problem, the teacher administers the tasks cited below to distinguish whether the child reveals a problem in organizing information visually, or in organizing visuo-motor responses.[2]
      (Note: A. Testing presupposes medical check-up, visual and auditory acuity testing. B. Age, educational level and intellect are important variables to be considered.)

Test No. 1
Visual–Memory–Motor

The teacher presents a word, number or figure. After the object is removed from sight, the child returns to a grid on the floor and *identifies* (from several choices) the specific illustration. (Refer to Figure 2-7.) Evaluative criteria: If the child fails Test No. 1, he has difficulty in organizing information visually and this may reflect a *VISUAL RESPONSE PROBLEM*. If the child passes Test No. 1 and fails Test No. 2, he has difficulty in organizing his visuo-motor responses and thus may have an *INTEGRATIVE PROBLEM*.

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[1] Edmund Jacobson, *Methods of Teaching Scientific Relaxation*, p. 3.

[2] Test items are based on the modification of materials presented by George H. Early, Frances E. Early and Earl J. Heath, *Educational Technology*, pp. 40-43.

Test No. 2
Visual–Memory–Motor

The teacher presents a word, number, or figure as in Test No. 1. The child must reproduce the exact pattern given by the teacher. (Object is to be removed from sight after it is viewed by the child.)

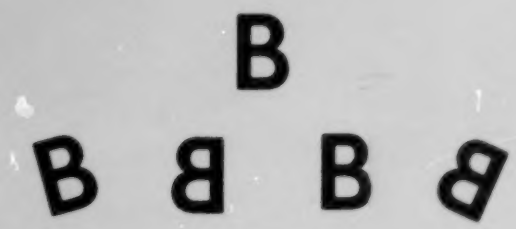

Fig. 2-7
Visual Response Test

d. The teacher can describe two tasks, with rationale, to remedy or ameliorate a visual response problem.
Evaluative criteria: tasks that require the subject to utilize and develop his perceptual ability in fairly pure form.

e. The teacher can describe two tasks, with rationale, to remedy a *visual-motor response* problem.

f. The teacher develops and teaches a perceptual-motor cognitive task.
Evaluative criteria: a task that requires the subject to utilize two or more sensory receptors (one of which is motor) simultaneously, while being involved in the decision-making process.

g. The teacher develops and teaches a perceptual-motor-cognitive-academic achievement task.
Evaluative criteria: a perceptual-motor-cognitive task which involves the incorporation of a mathematic reading, or science skill. It is essential that the teacher review the child's permanent record folder, regarding visual and learning evaluation, and discuss the child with the Learning Disability Specialist prior to conducting perceptual-motor screening.

D. ASSIGNMENTS FOR NEXT WEEK

1. Longitudinal Study
If the subject has been "classified" as having a perceptual or perceptual-motor problem, test to note whether it is a *perceptual response* or *perceptual-motor* problem and prescribe accordingly.[1] Design and teach one, or more, perceptual-motor cognitive-academic achievement tasks.
2. Teaching Model Kit
Review materials and PERT networks related to Breathing Problems and Motor Disabilities and Limitations.

IX. ADAPTED ACTIVITIES PROGRAM
BREATHING PROBLEMS and MOTOR DISABILITIES/LIMITATIONS

A. LECTURE

1. Breathing Problems
Definition.
Family or school physician referral procedure.
Measuring vital capacity.
wet or dry spirometer.
exhale method (hissing and stopwatch).
Breathing exercises to improve vital capacity[2] (refer to Chapter Nine).
Modified games and activities.
Flexible scheduling.
2. Motor Disabilities or Limitations
Definition.
Family or school physician referral procedure.
Measuring range of motion.
Determining degree of muscular atrophy.
Determining strength tolerance limits.
Use of crutches.
Use of cane.
Modified games and activities.
Flexible scheduling.

B. LABORATORY PRACTICUM EXPERIENCES

1. Breathing Problems
Vital capacity testing and recording progress.
Determining tolerance limits.
Teaching breathing exercises.
Explaining, demonstrating, and implementing modified games and activities.
2. Motor Disabilities or Limitations
Range of motion testing and recording scores.
Strength decrement index measurements via test and retest.
Explaining and demonstrating cane and crutch walking.
Modifying games.

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[1] All perceptual-motor prescriptions are to be made by learning disability specialists (LDS). Thus, potential problems revealed by "screening" should be referred to the LDS. Similarly, your suggested tasks should be approved before implementation.

[2] Ronald C. Adams, Alfred N. Daniel and Lee Rullman, *Games, Sports and Exercises for the Physically Handicapped*, pp. 229-230.

C. TEACHING COMPETENCIES TO BE STRESSED

1. Breathing Problems
   a. The teacher measures student's vital capacity via use of the wet or dry spirometer.
      Evaluative criteria: subject takes a deep breath, exhales via the mouthpiece slowly (without releasing air from the nostrils, or around mouthpiece) while bending forward at the waist.
   b. The teacher measures a student's vital capacity via use of the hissing and stopwatch method.
      Evaluative criteria: subject takes a deep breath, exhales via pursed lips (making a slow, hissing sound) while bending at the waist; teacher starts and stops stopwatch with the beginning and ending of expiration.
   c. Given a series of pre- and post-test vital capacity scores, the teacher determines the tolerance index and prescribes subsequent exercises accordingly.
      Evaluative criteria: when the post-test score is less than the pre-test score, the same prescription is continued. When the post-test score is the same as, or higher than, the pre-test score, the prescriptive exercises are increased.
   d. The teacher demonstrates and administers breathing exercises to a subject to improve his vital capacity.
      Evaluative criteria: breathing exercises listed in Chapter Nine.
   e. The teacher lists, and provides a rationale for, activities a subject with breathing problems can perform in the unrestricted program.
      Evaluative criteria: materials documented by valid source reference(s), particularly the American Medical Association, or their affiliates.

2. Motor Disabilities or Limitations
   a. The teacher measures knee joint range of motion via use of the Leighton flexometer and the goniometer.[1]
      Evaluative criteria: measurement directions to be distributed in class.
   b. The teacher determines the Strength Decrement Index (SDI)[2] of an atrophied muscle group by applying the formula:

$$SDI = \frac{S_b - S_a}{S_b} \times 100$$

Symbols:
S_b – before exercise strength
S_a – after exercise strength

   c. The teacher identifies the two common types of crutches and demonstrates the correct technique for fitting axillary crutches.
      Evaluative criteria: descriptive materials cited in Chapter Ten.
   d. The teacher demonstrates and teaches the correct procedure for "crutch-walking" using the four-point, three-point, two-point, swing-through gaits plus the "drag-to," "drag-through," "swing-to," and "swing-through" gaits.
      Evaluative criteria: descriptive materials cited in Chapter Ten.
   e. The teacher demonstrates and teaches the correct procedure for determining cane length and walking with a cane.
      Evaluative criteria: descriptive material in Chapter Ten.
   f. The teacher demonstrates and teaches two modified tasks and activities to:
      a child confined to a wheelchair
      a child utilizing crutches
      Evaluative criteria: referential source documentation, or logical rationale.

D. ASSIGNMENTS FOR NEXT WEEK

1. Longitudinal Study
   Administer the wet or dry spirometer, or exhale hissing test to subject.
   If appropriate, review and teach proper cane and crutch walking technique to the child.
   Post-test subject to evaluate progress in physical fitness and motor performance.
   Compile all case study material in a folder and present to the instructor at the beginning of the last class meeting.
2. Teaching Model Kit
   Review materials and PERT networks related to Communication Disorders.

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[1] H. Harrison Clark and David H. Clarke, *Developmental and Adapted Physical Education*, pp. 96-98.

[2] Ibid. 83.

X. ADAPTED ACTIVITIES PROGRAM: COMMUNICATION DISORDERS/PRE-K SCREENING

A. LECTURE

1. Communication Disorders
   Definition.
   Family or school physician referral procedure.
   Tasks to enhance auditory, tactile, kinesthetic perception.
   Tasks to enhance visual perception.
   Teaching cues.
   Structuring the learning environment.
   Modified games and activities.
   Flexible scheduling.
2. Pre-Kindergarten Screening Program
   Objectives of the screening test.
   Explanation and demonstration of testing techniques (see Appendix 10).
   Eliciting teacher and administrative support
   Setting-up and conducting the pre-kindergarten "round-up" session(s).
   Meeting with staff.
   Meeting with parents.
   Referrals to child study team and family, or school physician.
   Referrals to summer, or regular D&A Program.
   Written report to the board of education via the superintendent of schools.

B. LABORATORY PRACTICUM EXPERIENCES

1. Communication Disorders
   Testing auditory, visual, tactile and kinesthetic perceptual abilities.
   Explaining and demonstrating tasks to enhance perceptual abilites.
   Utilizing teaching methods to enhance learning.
   Explaining, demonstrating, implementing modified games and activities.
2. Pre-Kindergarten Screening Program
   Recording test scores and anecdotal remarks.
   Recording suggested prescriptive activities.
   Referral to proper personnel for follow-up.

C. TEACHING COMPETENCIES TO BE STRESSED

1. Communication Disorders
   a. Given a child with partially-sighted vision, the teacher administers psycho-physical tests to assess peripheral vision and depth perception.
      Evaluative criteria: test directions to be distributed in class.
   b. The teacher demonstrates and teaches two tasks and activities to enhance peripheral vision and two tasks to enhance depth perception.
      Evaluative criteria: tasks and activities that increase peripheral vision, depth perception—tasks and activities that involve utilization of the eyes in judging different distances.
   c. The teacher designs and utilizes a novel screening test to assess the blind student's awareness of his body in a static position.
      Evaluative criteria: measurement of body or body part in requested position; determination of degree of error from norm.
   d. The teacher demonstrates and teaches one task or activity to enhance the kinesthetic "feel" of an arm or leg and/or total body in movement pattern.
      Evaluative criteria: use of other sensory feeback to aid the subject in developing the kinesthetic awareness of his body in a movement pattern.
2. Pre-Kindergarten Screening Program
   a. The teacher explains, demonstrates and administers the Township of Ocean Pre-Kindergarten Motor Ability Screening Test to one child.
      Evaluative criteria: test directions in Chapter Five.
   b. The teacher diagnoses motor problems and prescribes tasks and activities as a result of objective and subjective assessment of student performance.
      Evaluative criteria: prescription based on test scores and observation: correct utilization of Motor Ability Resource Tasks and Activities (Chapter Five).
3. General Competencies
   a. The teacher modifies and teaches one game for children manifesting each of the following personal disabilities: the partially-sighted or blind; the hard-of-hearing or deaf; and the non-communicative.
      Evaluative criteria:[1] games may be modified in terms of: reducing the size of the playing area; using lighter equipment; slowing down moving objects; modifying the rules; and providing additional rest periods.
   b. The teacher conducts a longitudinal study of one "classified" student in his school district.
      Evaluative criteria: a case study which includes anecdotal remarks regarding a review of personal and medical files: conferences with medical personnel, guidance counselor, Child Study Team, teacher(s), parents and pupil; and a TAPE Program with summary remarks.

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[1] John H. Doolittle, *Adaptation of Games and Activities*, Physical Education 400—Laboratory Exercises 1.

CHAPTER THREE

PERT NETWORK GUIDELINES FOR PROGRAM DEVELOPMENT [1]

INTRODUCTION

The planning, organizing and implementing of a comprehensive physical edcuation program for handicapped children requires careful, deliberate, reflective thinking. The procedure used clearly delineates: the different aspects of the program; the responsibilities and authorities of those involved; the man-hours necessary to perform the various functions; and the interrelationships and coordination necessary for program success.

After careful consideration, it was decided that a major contribution could be made by presenting audio-visual materials designed to provide concrete guidelines for program development. (Discussion with teachers in New Jersey and in other states, has revealed the need for program guidelines to be of major importance.) As a result, the materials presented in Chapter Three deal with the "specifics" of planning, organizing, and implementing a physical education program for the handicapped.

The use of a series of PERT networks was selected as the means of achieving the objectives cited above, because they provide a graphic procedure for conveying the necessary information. Further, reproduced copies of the networks can be posted in class to serve as daily guidelines for the teacher and student; thus, valuable class time can be devoted to activity.

During the past decade, education has been adopting techniques utilized by "big business." Education is "big business" in that school budgets of $1,000,000 or more are commonplace today. One of these is the "PERT" Network which stands for Program Evaluation and Review Technique. Thus, a PERT network is a systematic procedure for conducting any operation through to its successful conclusion.

Effective utilization of the networks presented requires familiarization with some basic terminology and a general understanding of the interrelationships of a network.

Definitions[2]

Network: A system of lines which are connected and interrelated. However, a breakdown in one line does not affect all lines. Further, one cannot recycle activities through a network (i.e., activities always flow from left to right).

Node: Points where lines intersect. Each node (referred to as an event) is an action and decision point.

Line Segment: Line segments are referred to as "activity lines." In other words nodes (events) are connected by activity lines. The following network component represents the process:

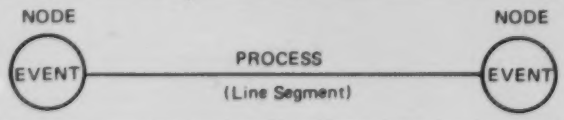

Fig. 3-1 The Basic Elements Of A Network

Distinction between an Event and an Activity: An event is the initiation or the completion of an activity, not the activity itself. The following example from Network 21 (on page 37) will clarify the distinction:

[1] PERT is an acronym for Program Evaluation Review Technique, a systematic procedure for planning a sequence of activities.

[2] Paraphrased from lectures and materials of Title III workshops conducted by the New Jersey Department of Education, Division of Research Planning and Evaluation, May 30, 1972 and June 6, 1972.

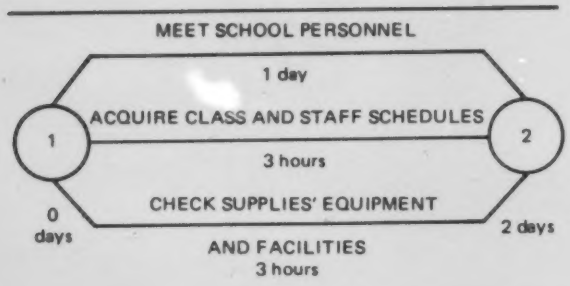

Fig. 3-2 Distinction Between An Event And An Activity

Point ① refers to the initiating of meeting school personnel, acquiring class and staff schedules, or checking supplies, etc. Point ② refers to the completion of those activities. The intervening lines between points ① and ② are the activity lines.

Network Interrelationships

As indicated previously, networks flow from left to right. However, the proper flow is dependent upon certain conditions. For example, using the illustration in Figure 3-2, one cannot start event ② until activities emanating from event ①, have all been completed; thus, ① is a "contraint" on ②. If our network reflected the pattern below, ① and ② would be considered "constraints" on ③.

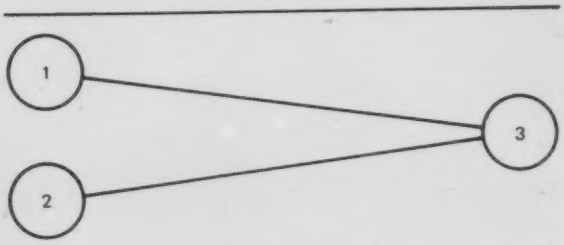

Fig. 3-3 Constraint Relationship

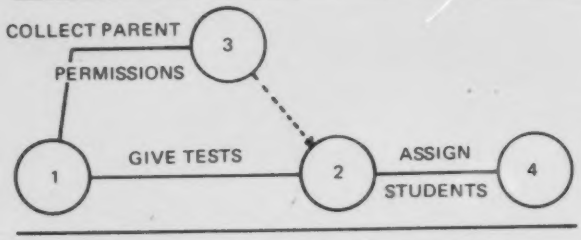

Fig. 3-4 Dummy Line: No Effort, No Activity

In certain situations, one event may be a constraint on another, but no real activity connects them. Consider Fig. 3-4.

Event ③ indicates "complete collecting of parental permission"—a constraint on event ②. However, between ② and ③ a dotted line exists (i.e., a "dummy" line exists which requires no effort or time).

One of the advantages of using a PERT network is that it requires "time lines" for determining the "earliest," "latest," and "slack times" necessary to perform a series of events. The purpose of the "time lines" is to provide the implementer with a means of evaluating his progress toward a projected completion date. In the event difficulties are encountered, which threaten completing the project on time, the "time lines" provide opportunities for implementing a series of alternatives.

Reference to Figure 3-2 illustrates "predicted" time lines. Note that two days have been provided for completion of the three activities emanating from event ①. Also note that there is a time variation allotted for completing each task. For the sake of brevity and ease of interpretation of time lines, the implementer can adjust the activity times within ① and ② in any manner as long as he completes event ① in two days.

Figure 3-5 provides the remainder of Network 21 which deals with School and Program Director Orientation. Let us analyze the network together (refer to Figure 3-5 on page 37).

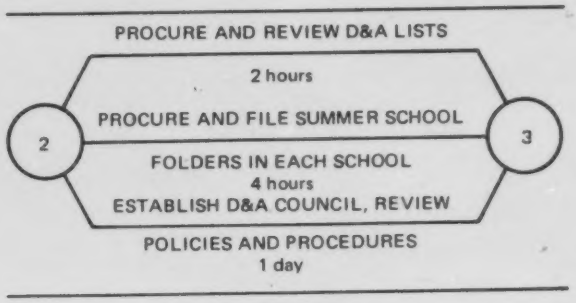

Fig. 3-5 Network Reflecting Three Constraints on Event 3

Once again the activities cited in Figure 3-5 (school orientation) are constraints on event ③. When all activities are completed, the implementer starts and endeavors to complete all activities emanating from event ②. If a summer school program does not exist, the time allotted for that activity can be utilized to complete another activity that exists between ② and ③.

ACTIVITY CHECKLISTS

The listing of all tasks and activities to be performed is the most important requisite to the development of any network. The reader will note each PERT network is explained in detail in the last part of the chapter under the

heading "Activity Checklists." The checklists have been prepared to provide:

1. The detail necessary to successfully complete each activity.
2. A simplified procedure for interrelating the activity information with its network counterpart.

Follow the procedure explained for interpreting and implementing all networks and checklists included in Chapter Three. (Baker and Eris,[1] Burns,[2] and Cook[3] provide additional reference materials for the reader desirous of expanding his knowledge in this area.)

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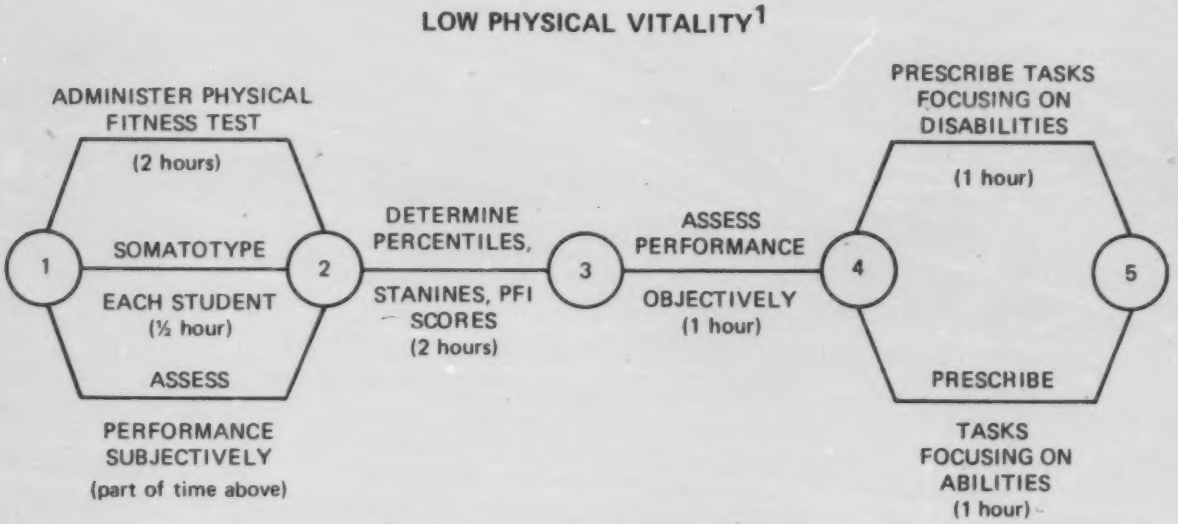
[1]Bruce N. Baker and Rene L. Eris, *An Introduction to PERT-CPM.*

[2]Joseph L. Burns, *A Catalog of Computer Programs for PERT.*

[3]Desmond L. Cook, *Program Evaluation and Review Technique Applications in Education.*

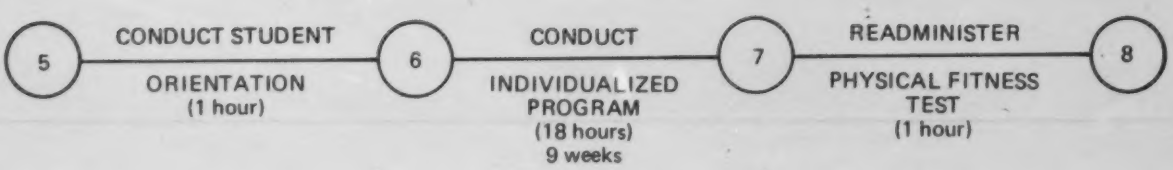
D&A PROGRAM NETWORKS

NETWORK 1

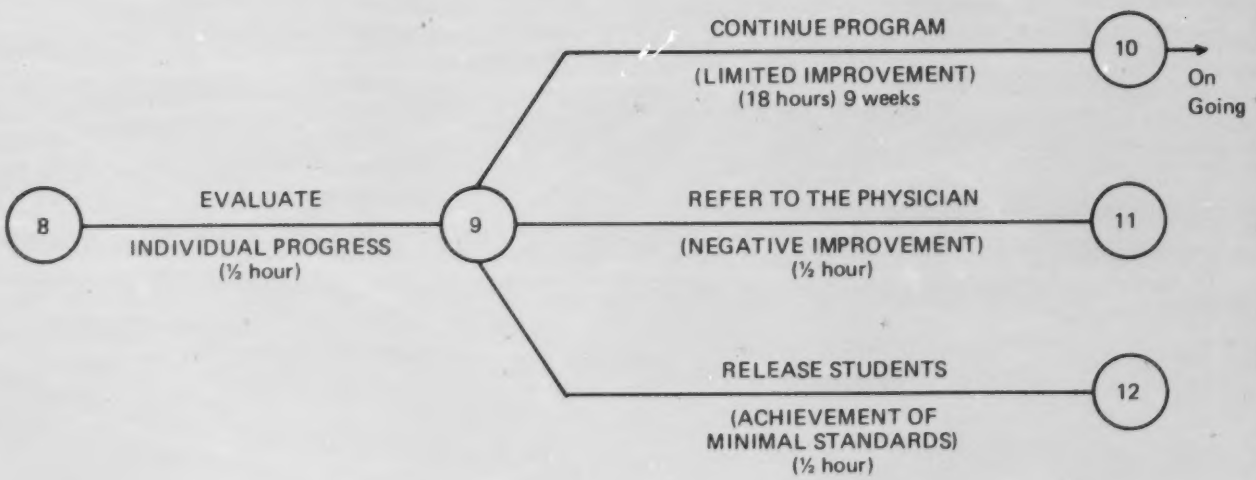


[1]Note: The time lines established for Low Physical Vitality and subsequent categories are based on a teacher-pupil ratio of 1-10.

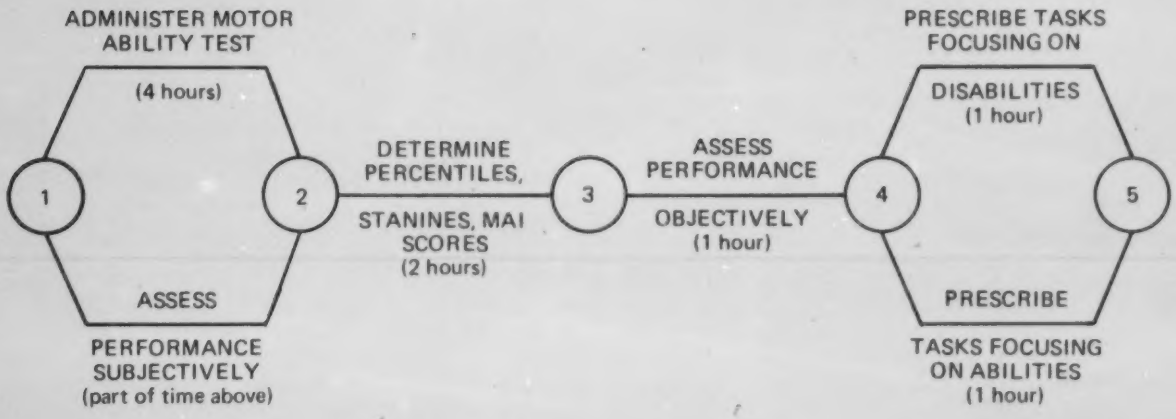
NETWORK 2
LOW PHYSICAL VITALITY



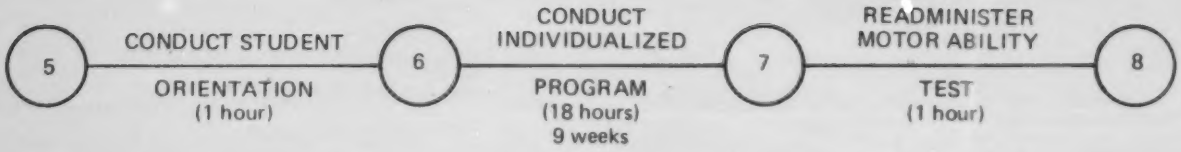
NETWORK 3
LOW PHYSICAL VITALITY



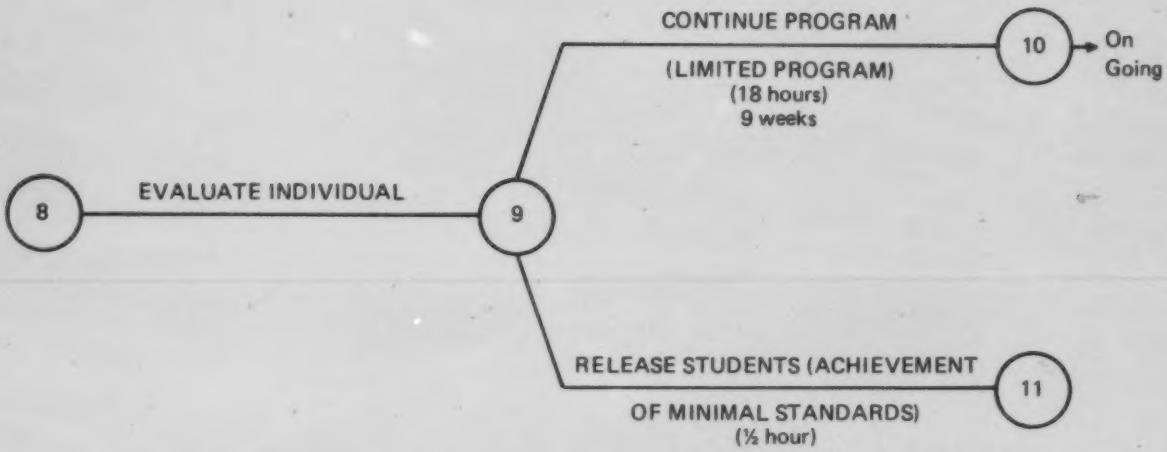
NETWORK 4
LOW MOTOR ABILITY



NETWORK 5
LOW MOTOR ABILITY

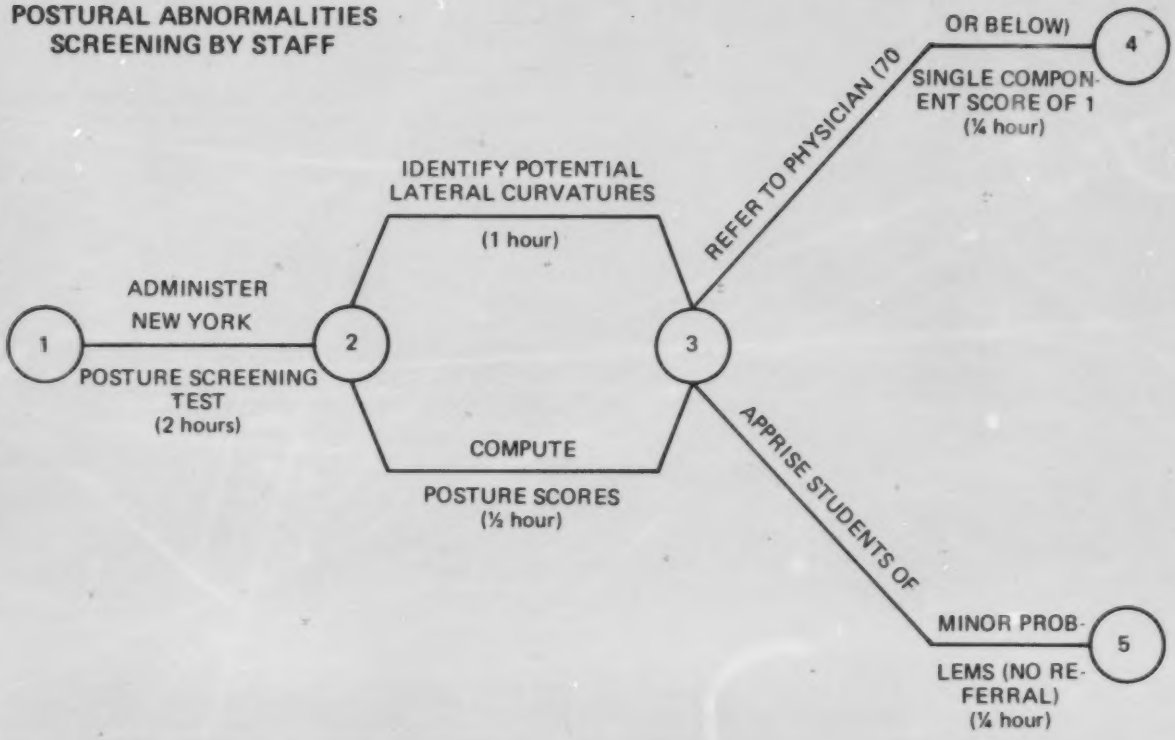


NETWORK 6
LOW MOTOR ABILITY



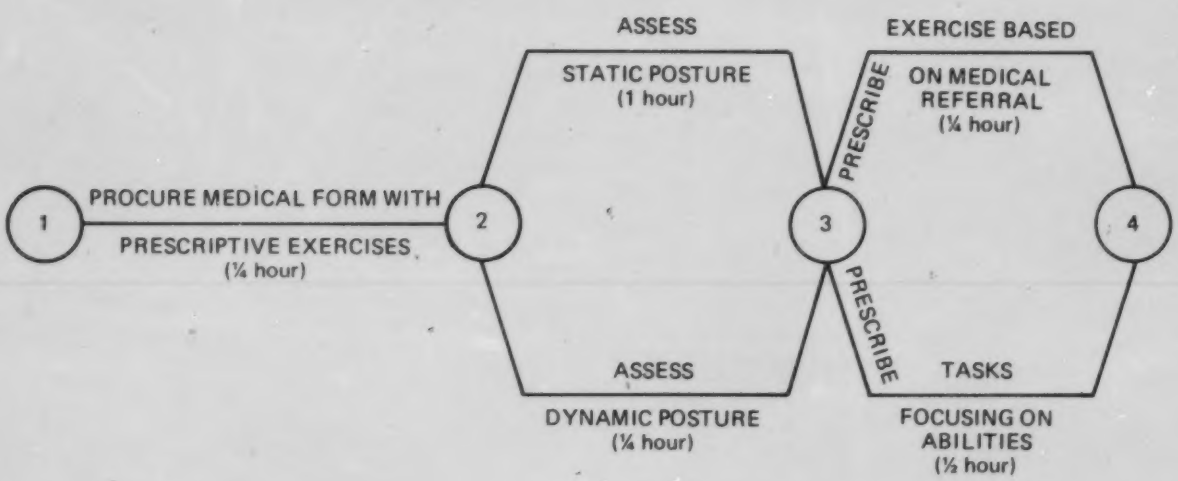
NETWORK 7

POSTURAL ABNORMALITIES SCREENING BY STAFF



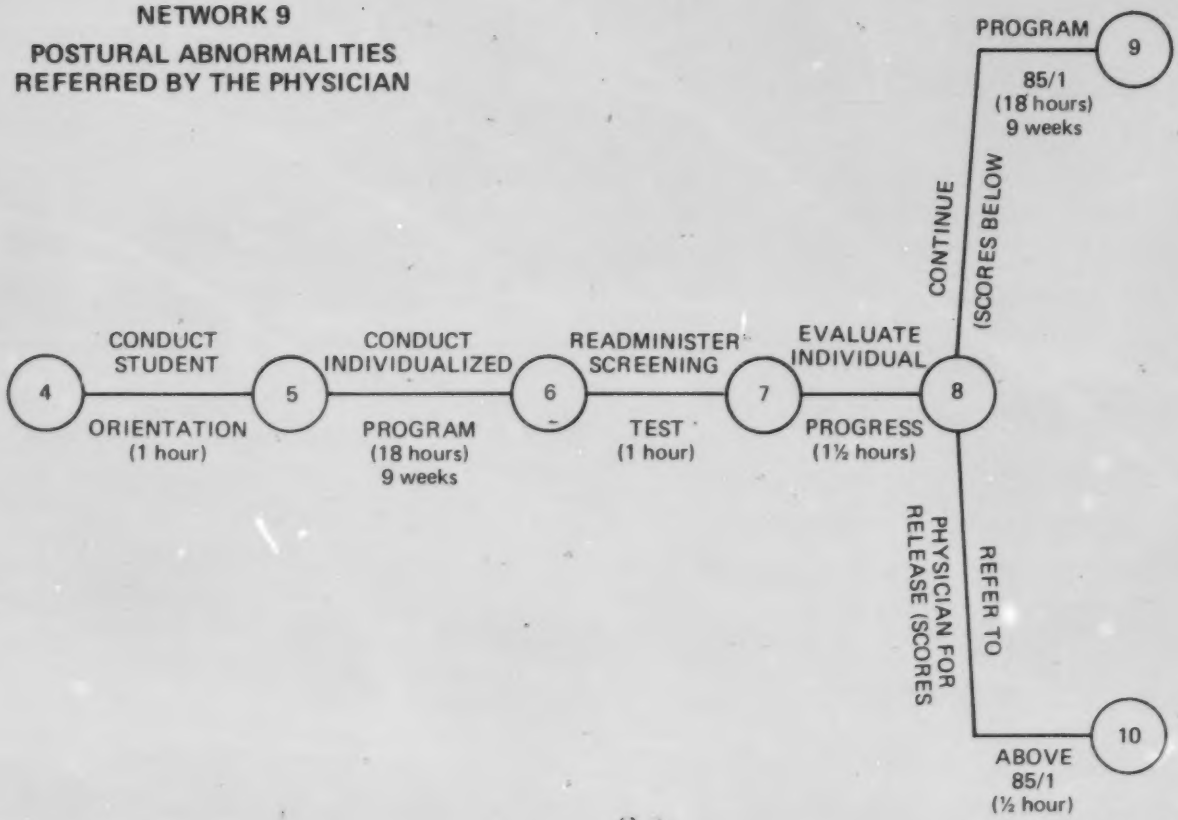
NETWORK 8

POSTURAL ABNORMALITIES REFERRED BY THE PHYSICIAN

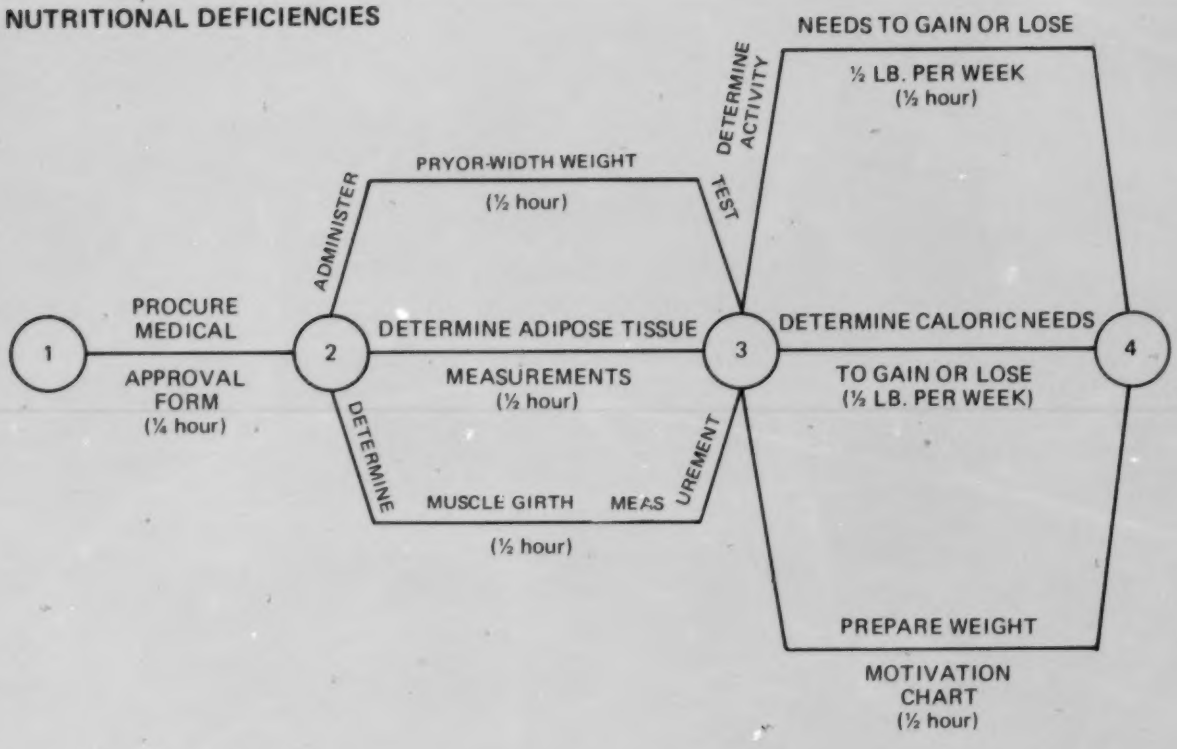


NETWORK 9

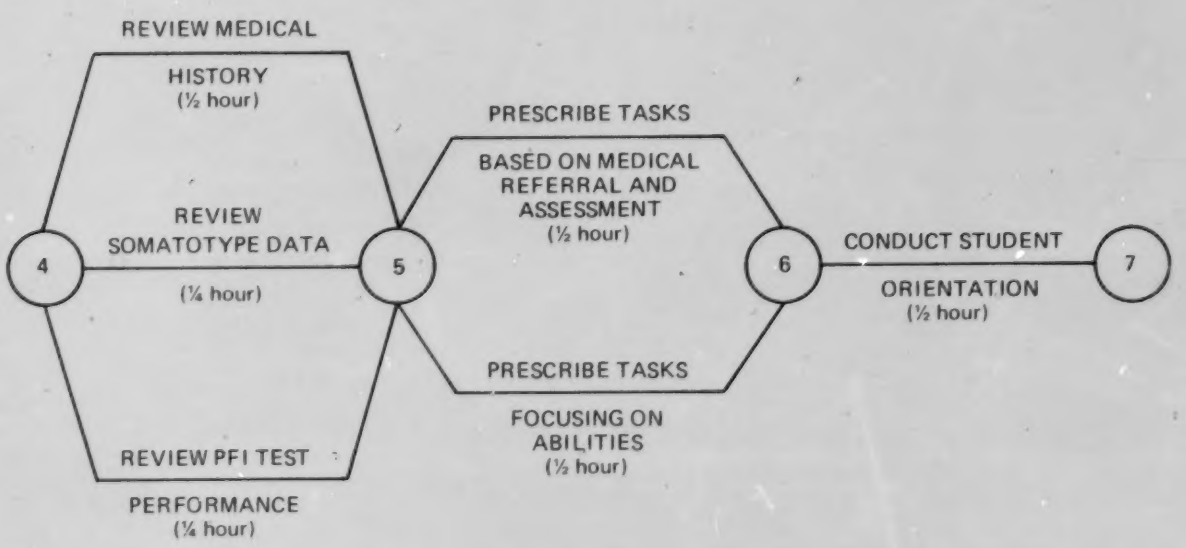
POSTURAL ABNORMALITIES REFERRED BY THE PHYSICIAN



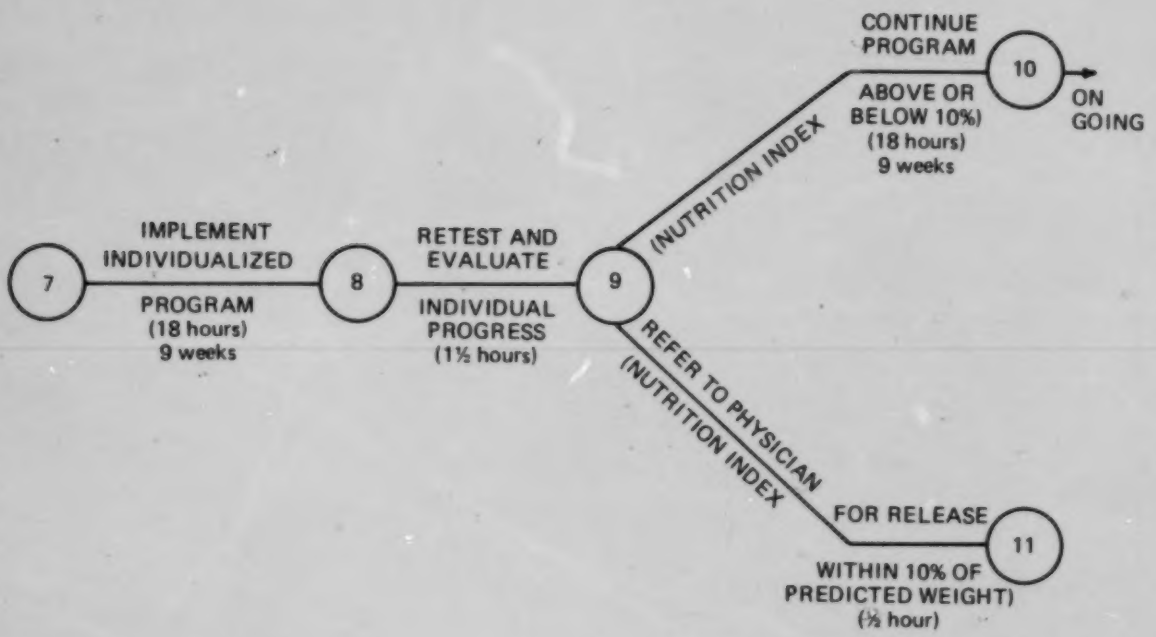
NETWORK 10
NUTRITIONAL DEFICIENCIES



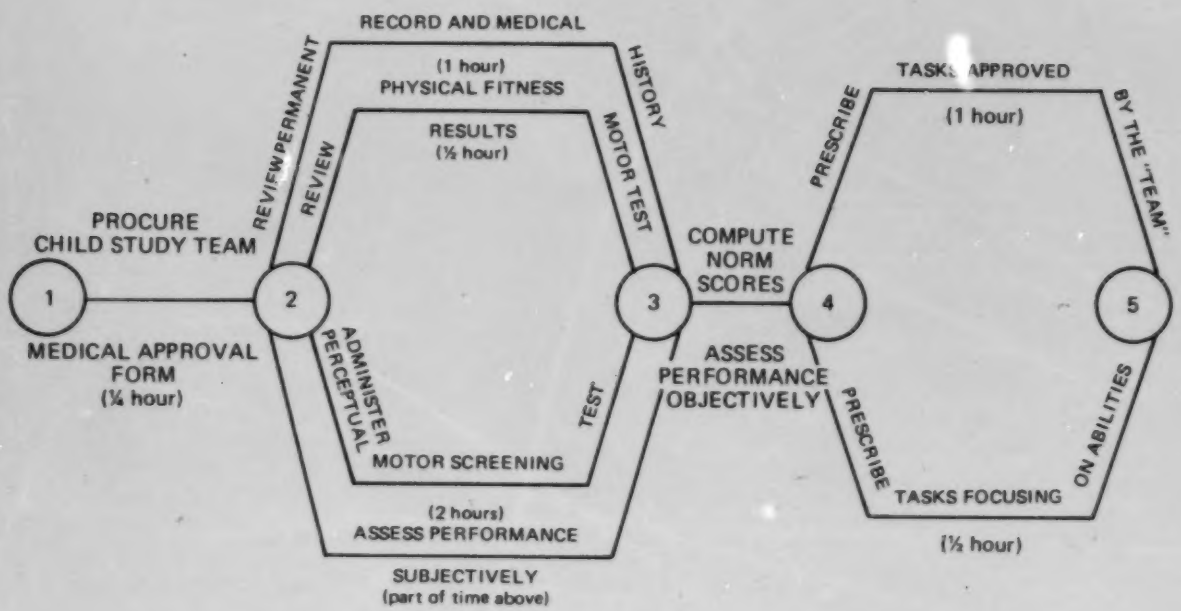
NETWORK 11
NUTRITIONAL DEFICIENCIES



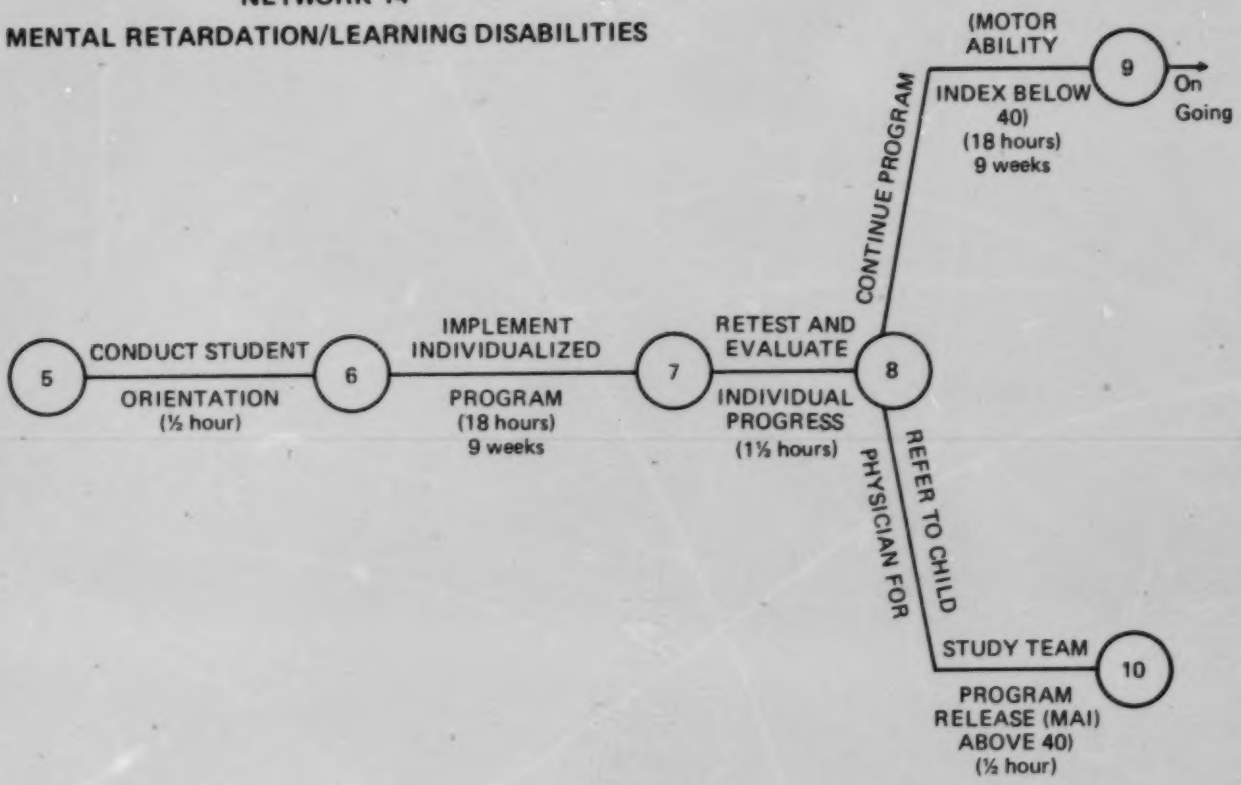
NETWORK 12
NUTRITIONAL DEFICIENCIES



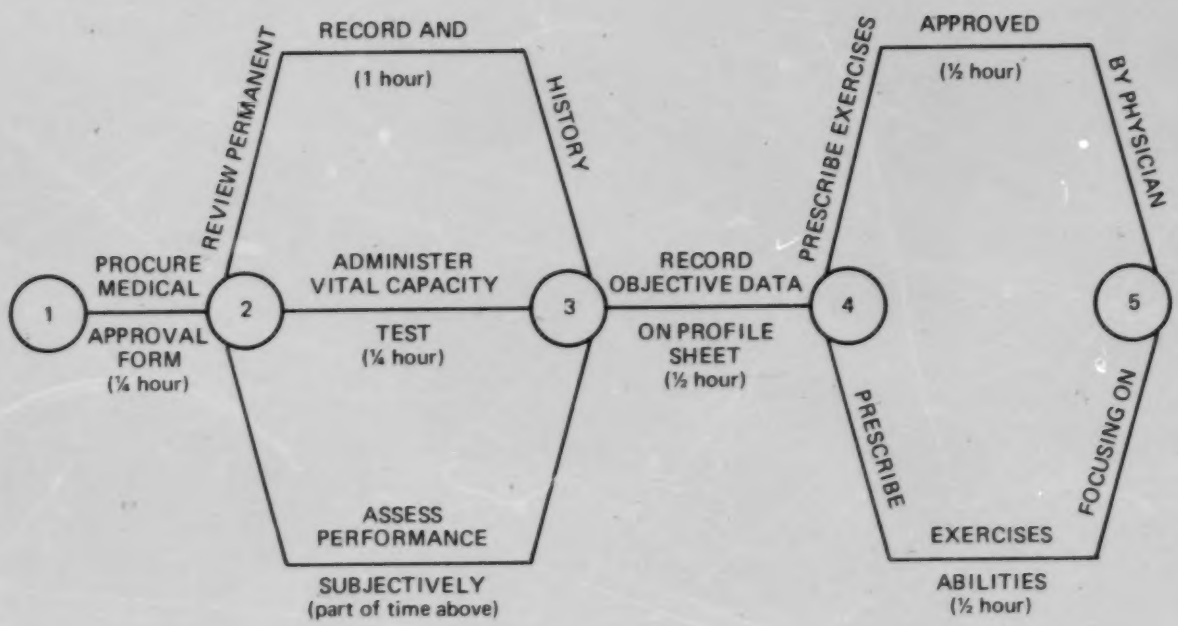
NETWORK 13
MENTAL RETARDATION/LEARNING DISABILITIES



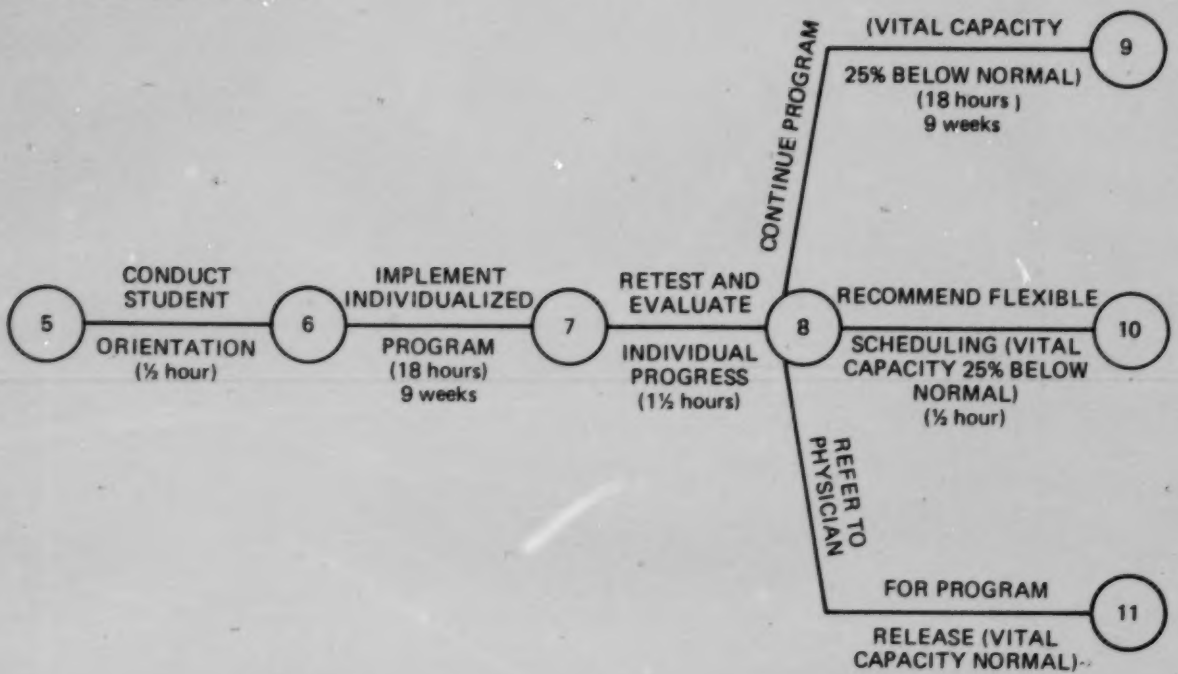
NETWORK 14
MENTAL RETARDATION/LEARNING DISABILITIES



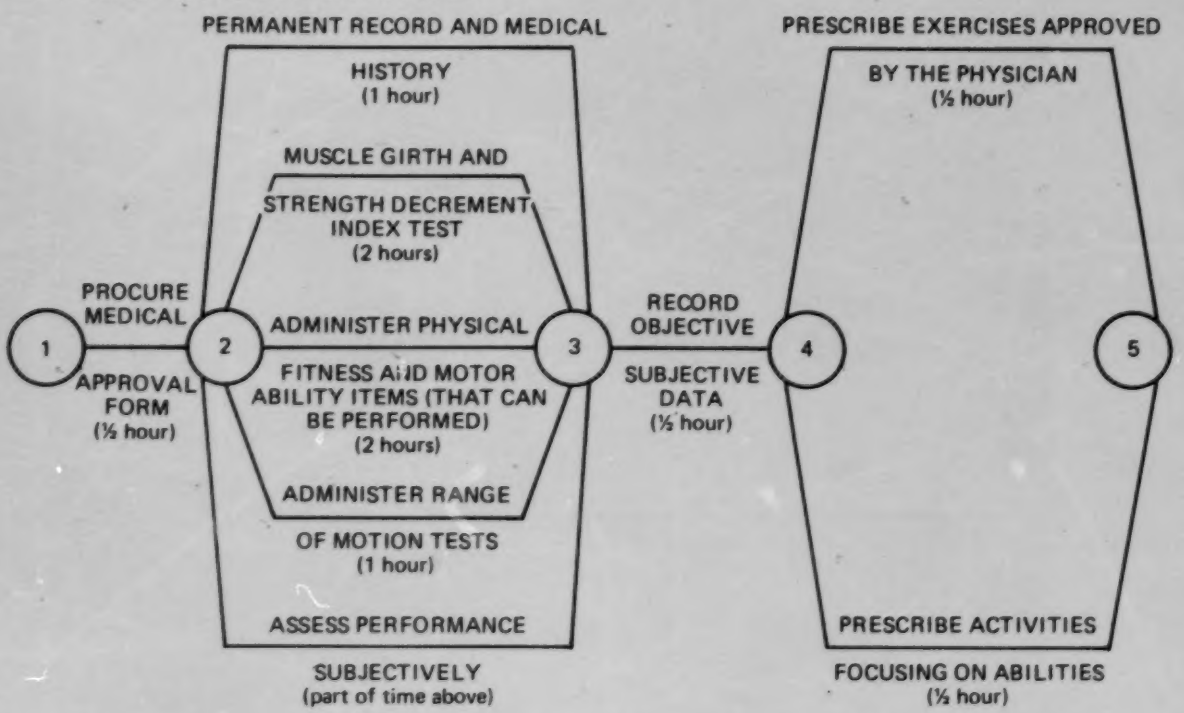
NETWORK 15
BREATHING PROBLEMS



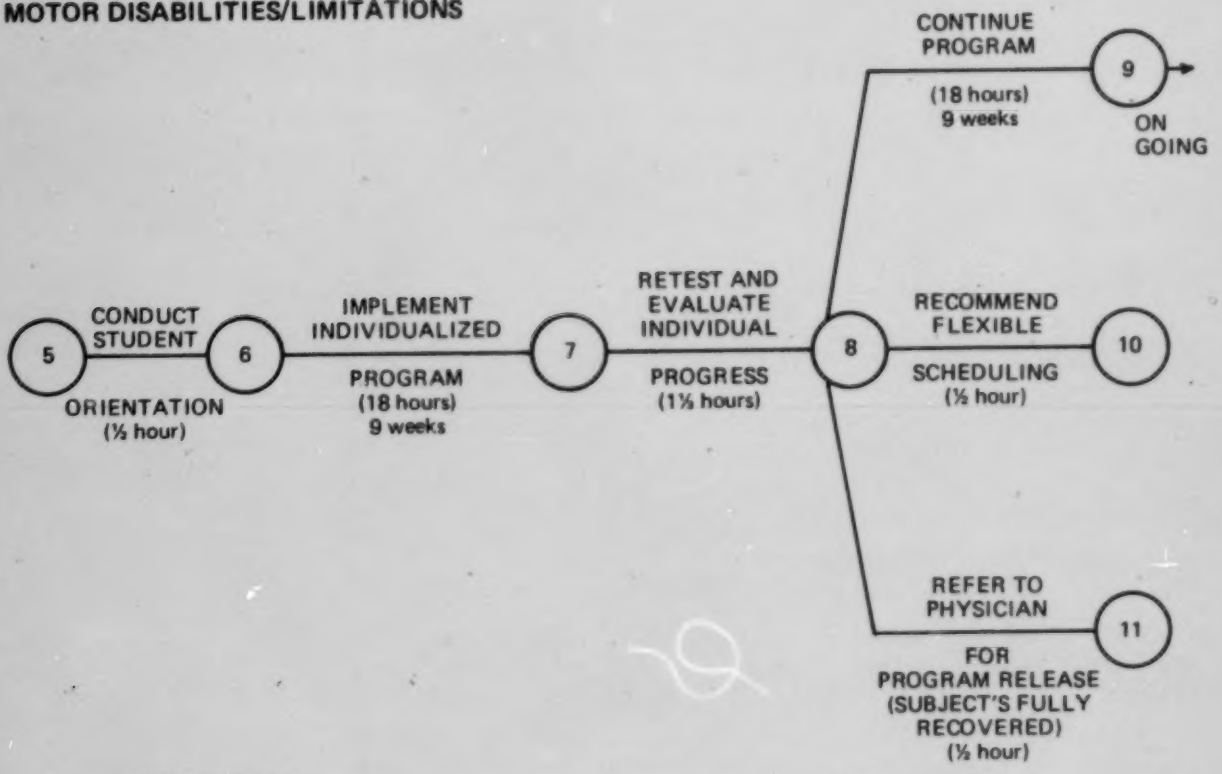
NETWORK 16
BREATHING PROBLEMS


5
CONDUCT STUDENT ORIENTATION (½ hour)
6
IMPLEMENT INDIVIDUALIZED PROGRAM (18 hours) 9 weeks
7
RETEST AND EVALUATE INDIVIDUAL PROGRESS (1½ hours)
8
CONTINUE PROGRAM
(VITAL CAPACITY 25% BELOW NORMAL) (18 hours) 9 weeks
9
RECOMMEND FLEXIBLE SCHEDULING (VITAL CAPACITY 25% BELOW NORMAL) (½ hour)
10
REFER TO PHYSICIAN FOR PROGRAM RELEASE (VITAL CAPACITY NORMAL)
11

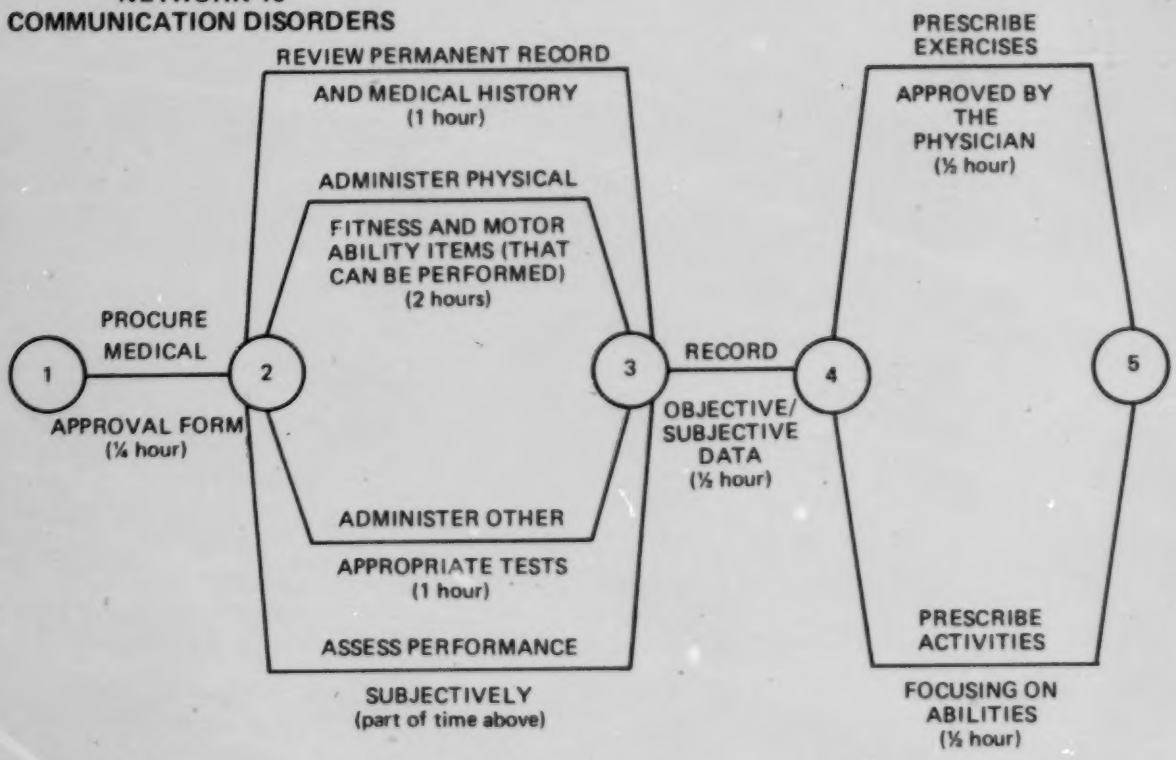
NETWORK 17
MOTOR DISABILITIES/LIMITATIONS


1
PROCURE MEDICAL APPROVAL FORM (½ hour)
2
PERMANENT RECORD AND MEDICAL HISTORY (1 hour)
MUSCLE GIRTH AND STRENGTH DECREMENT INDEX TEST (2 hours)
ADMINISTER PHYSICAL FITNESS AND MOTOR ABILITY ITEMS (THAT CAN BE PERFORMED) (2 hours)
ADMINISTER RANGE OF MOTION TESTS (1 hour)
ASSESS PERFORMANCE SUBJECTIVELY (part of time above)
3
RECORD OBJECTIVE SUBJECTIVE DATA (½ hour)
4
PRESCRIBE EXERCISES APPROVED BY THE PHYSICIAN (½ hour)
PRESCRIBE ACTIVITIES FOCUSING ON ABILITIES (½ hour)
5

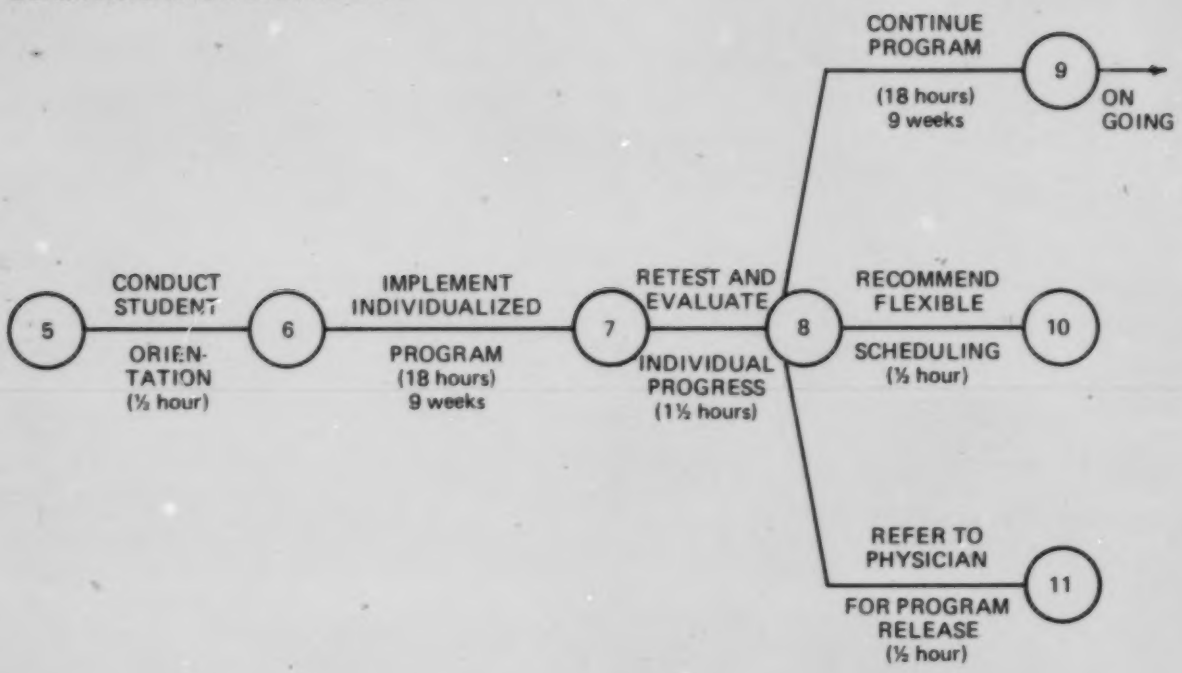
NETWORK 18
MOTOR DISABILITIES/LIMITATIONS



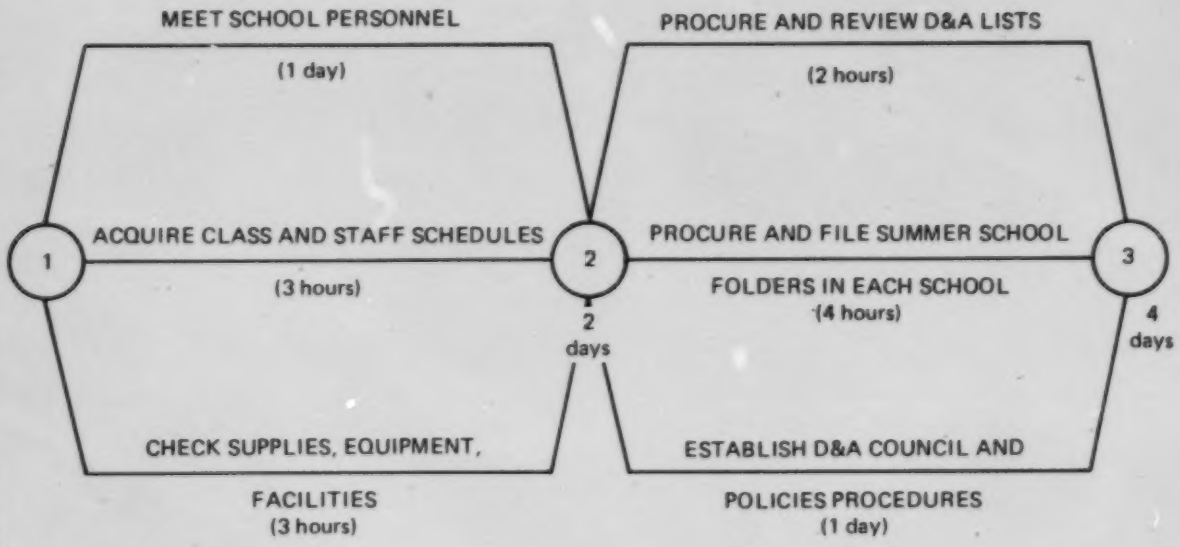
NETWORK 19
COMMUNICATION DISORDERS



NETWORK 20
COMMUNICATION DISORDERS

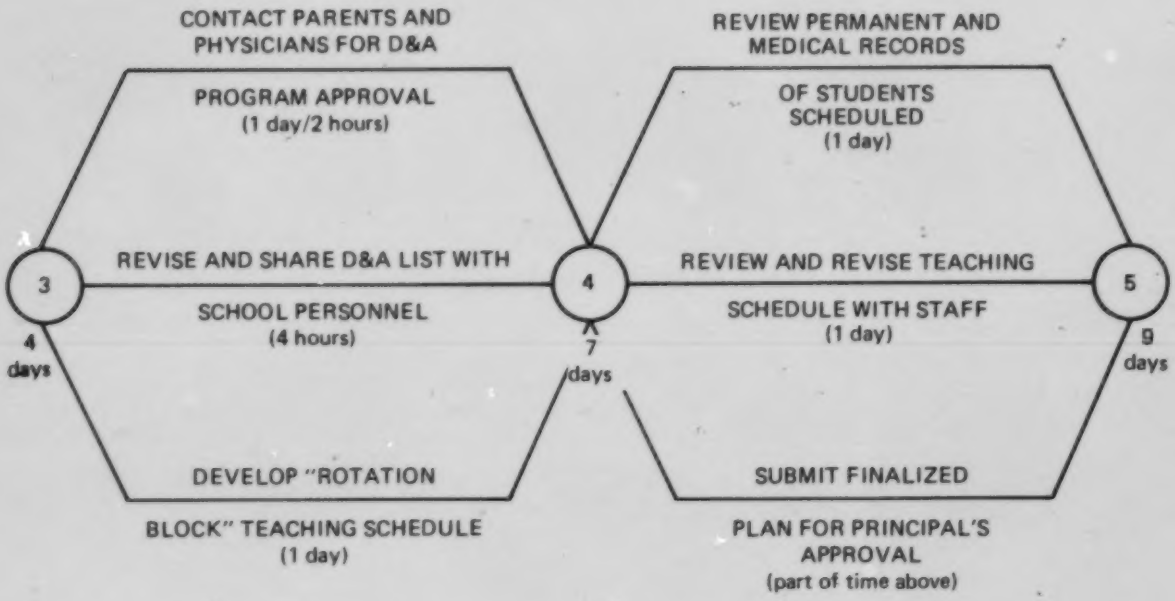


NETWORK 21
SCHOOL/PROGRAM DIRECTOR ORIENTATION[1]

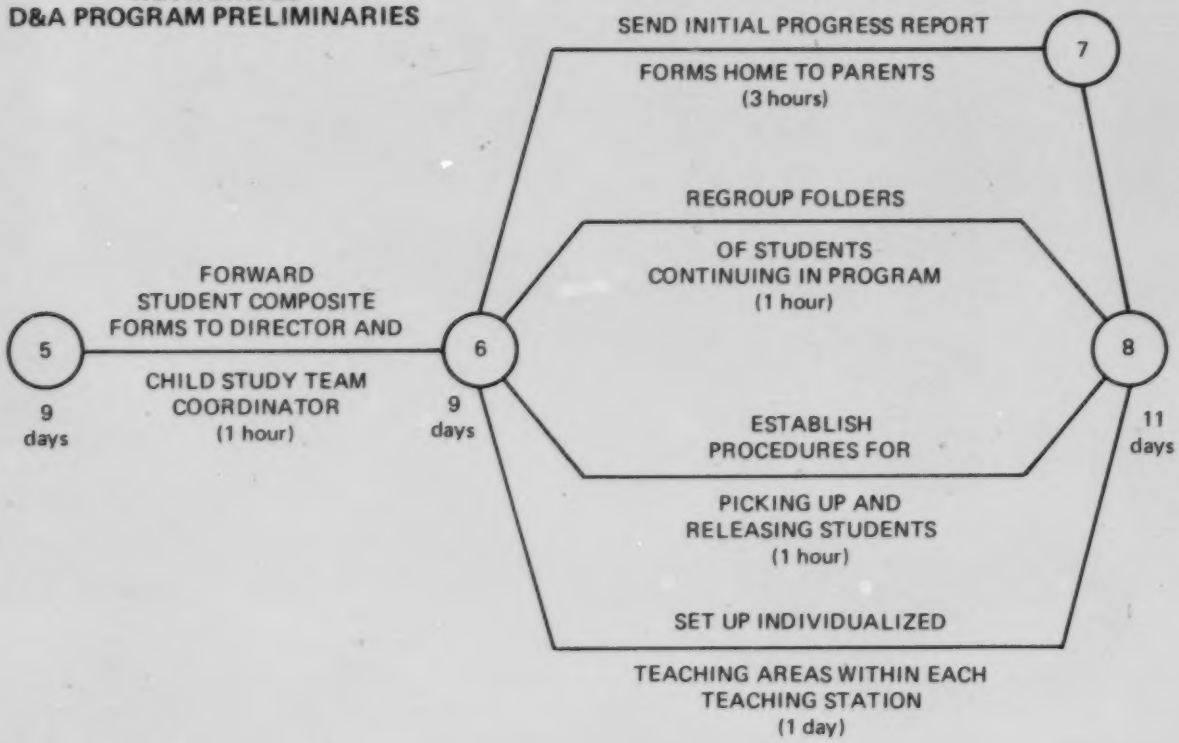


[1]Networks 21-25 provide guidelines for the department chairman, supervisor, or administrator who is responsible for organizing, implementing, and administering the total program.

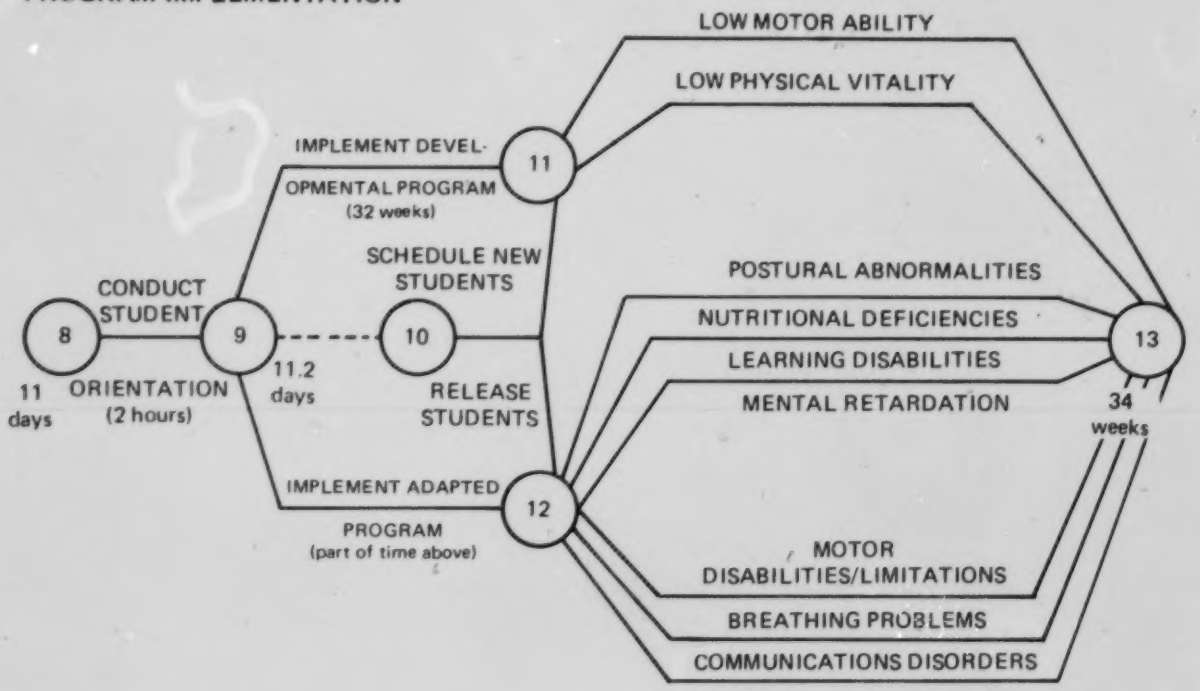
NETWORK 22
PLAN/REVIEW D&A SCHEDULE


CONTACT PARENTS AND PHYSICIANS FOR D&A
PROGRAM APPROVAL (1 day/2 hours)
REVISE AND SHARE D&A LIST WITH SCHOOL PERSONNEL (4 hours)
DEVELOP "ROTATION BLOCK" TEACHING SCHEDULE (1 day)
REVIEW PERMANENT AND MEDICAL RECORDS OF STUDENTS SCHEDULED (1 day)
REVIEW AND REVISE TEACHING SCHEDULE WITH STAFF (1 day)
SUBMIT FINALIZED PLAN FOR PRINCIPAL'S APPROVAL (part of time above)
3
4
5
4 days
7 days
9 days

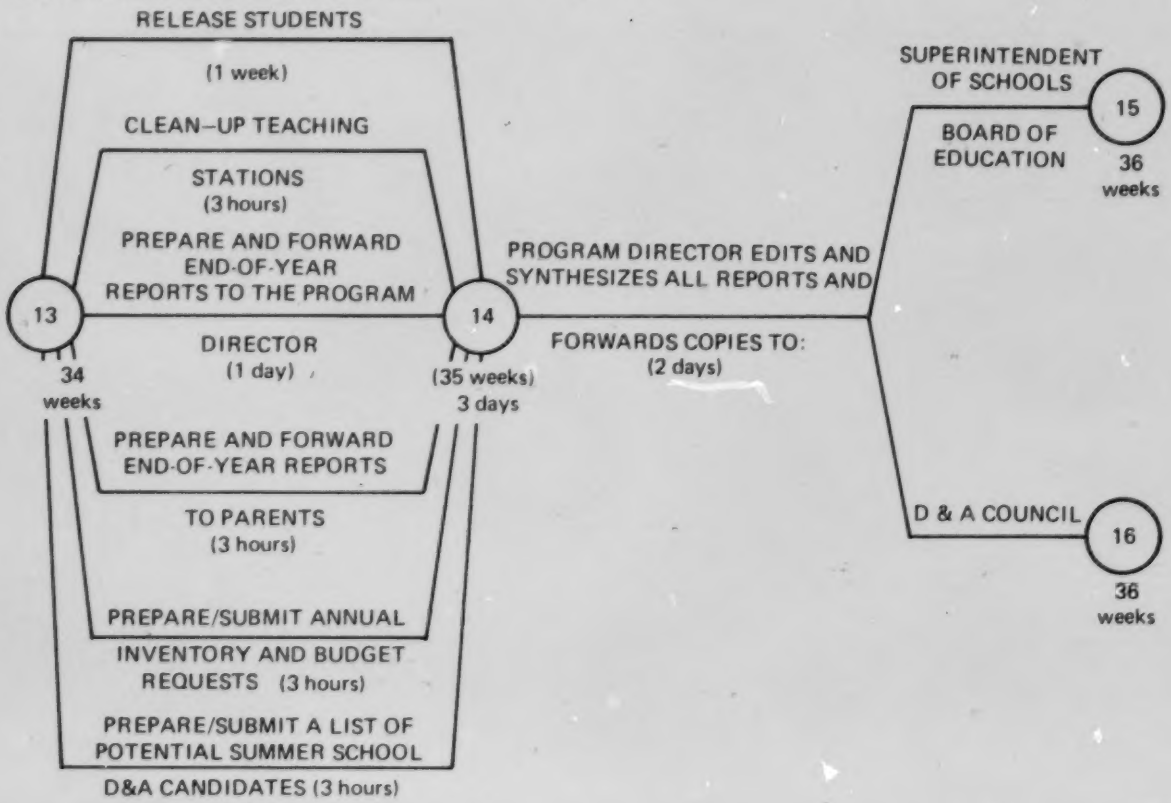
NETWORK 23
D&A PROGRAM PRELIMINARIES


FORWARD STUDENT COMPOSITE FORMS TO DIRECTOR AND CHILD STUDY TEAM COORDINATOR (1 hour)
SEND INITIAL PROGRESS REPORT FORMS HOME TO PARENTS (3 hours)
REGROUP FOLDERS OF STUDENTS CONTINUING IN PROGRAM (1 hour)
ESTABLISH PROCEDURES FOR PICKING UP AND RELEASING STUDENTS (1 hour)
SET UP INDIVIDUALIZED TEACHING AREAS WITHIN EACH TEACHING STATION (1 day)
5
6
7
8
9 days
9 days
11 days

NETWORK 24
PROGRAM IMPLEMENTATION



NETWORK 25
SCHOOL CLOSING PROCEDURES



D&A PROGRAM ACTIVITY CHECKLISTS

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
1	12		**IMPLEMENT PROGRAM FOR STUDENTS WITH LOW PHYSICAL VITALITY**	1-3	Test, assess, prescribe, implement, evaluate student progress at nine-week intervals and represcribe accordingly
1	2	2 hours	Administer Physical Fitness Test · Explain and demonstrate test items · Distribute scoring sheets and pencils · Pair-up students · Post test directions	1	Township of Ocean Physical Fitness Test will be administered to all students, 1-12
1	2	part of time above	Assess Performance Subjectively · Identify areas of deficiency · Record anecdotal remarks as to "how" the students perform	1	Teacher will observe student performance in grades 1-12; student will observe partner's performance in grades 9-12
1	2	½ hour	Somatotype Each Student · Explain and demonstrate somatotyping procedure · Post somatotyping directions · Record the two basic somatotyping characteristics of each student	1	Teacher to somatotype each student, grades 1-8; students to somatotype partners, grades 9-12
2	3	2 hours	Determine Percentiles, Stanines, PFI Scores · Explain and demonstrate compu-	1	Teacher will determine scores in grades 1-8; each student will determine his own scores in grades 9-12

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			tation procedures ·Record percentile, stanine and PFI scores ·Post percentile and stanine norms		
3	4	1 hour	Assess Performance Objectively ·Identify students with PFI Scores of 35 and below, or a Recovery Index of 40 or above ·Prepare a list of students with deviant scores for D&A referral	1	Teacher will assess performance in grades 1-8; student will assess personal performance in grades 9-12
4	5	1 hour	Prescribe Tasks Focusing on Disabilities ·Develop a series of exercises to strengthen the *specific* deficiencies i.e., arm, leg, abdominal strength, and/or cardiorespiratory endurance ·Structure exercises so that tasks are achievable by *all* students ·Design program so that it incorporates the overload concept (half of the period)	1	Teacher will prescribe tasks, grades 1-8; students will prescribe tasks, grades 9-12
4	5	1 hour	Prescribe Tasks Focusing on Abilities	1	Teacher will prescribe tasks based on pupil interest, grades 1-8; students will

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			•Discuss activity interests with students •Explain, demonstrate and post motivating activities •Prescribe activities which can be conducted within the existing facilities (half of the period)		prescribe tasks based on their interest, grades 9-12
5	6	1 hour	Conduct Student Orientation •Explain the values derived from an individualized physical conditioning program •Explain the daily class and release procedures •Discuss the physio-logical values of utilizing the "overload" principle •Prepare student folders and forms	2	Program values, daily class and release procedures will be discussed; all necessary student forms will be prepared
6	7	18 hours (9 weeks)	Conduct Individualized Program •Record weight weekly •Record muscle girth measurements periodically •Establish definite stations, recording procedures and procedures for filing folders, storing supplies and equipment	2	Individualized program focusing on specific disabilities and abilities will be conducted two or three times each week (in addition to the regular program)

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			.Record dates and accomplishments on Individual Prescription Cards		
7	8	1 hour	Readminister Physical Fitness Test .Recompute percentiles, stanine and PFI scores .Readminister muscle girth measurements	2	Students will be retested to determine progress
8	9	½ hour	Evaluate Individual Progress .Determine student progress on each test item on the test battery (in terms of improvement as well as achievement)	3	Post-test results will be analyzed
9	10	18 hours (9 weeks)	Continue Program, Limited Improvement .Modify prescriptions to stimulate motivation	3	Students indicating limited progress will be scheduled for another nine-week period
9	11	½ hour	Refer to Physician, Negative Improvement .Administer health-habit questionnaire	3	Referral to ascertain whether a medical problem exists (if indicated)

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			.Schedule medical examination to ascertain possible cause(s)		
9	12	½ hour	Release Students, Achievement of Minimal Standards .Release students who attain a PFI score of 50, or a Recovery Index of 20 or less .Release students who made improvement consistent with their somatotype	3	Self-explanatory
1	11		**IMPLEMENT PROGRAM FOR STUDENTS WITH LOW MOTOR ABILITY**	4-6	
1		4 hours	Administer Motor Ability Test .Explain and demonstrate test items .Administer test items on a group basis (those that are feasible) .Administer more difficult items on a one-to-one basis (after starting a group activity), or use teacher aides, paraprofessionals, and students to assist with the	4	Township of Ocean Motor Ability Test will be administered to all students in grades K-2, plus those with severe learning disabilities or mental retardation

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			testing .Record raw scores .Post test directions		
1	2	part of time above	Assess Performance Subjectively . Identify areas of deficiency . Record anecdotal remarks as to "how" the student performs	4	Teacher will observe and note motor pattern problems
2	3	2 hours	Determine Percentiles, Stanines, PFI Scores . Explain and demonstrate computation procedures to aides . Record norm scores . Post percentile and stanine norms	4	Teacher will determine test scores; the aide(s) can determine norm scores
3	4	1 hour	Assess Performance Objectively .Identify students with MAI scores of 35 and below, or a single index score of 20 .Prepare a list of students with deviant scores for D&A referral	4	Teacher will assess student performance
4	5	1 hour	Prescribe Tasks Focusing on Disabilities .Develop a series of tasks to strengthen the specific deficien-	4	Teacher will prescribe tasks to improve motor performance

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			cies (i.e., gross body coordination, gross body balance, eye and hand coordination, eye and hand accuracy, eye and foot accuracy)		
4	5	1 hour	Prescribe Tasks Focusing on Abilities -Discuss activity interests with children -Explain and demonstrate new games -Prescribe games such as "Follow the Leader" so that children are given a choice.	4	Tasks will be prescribed on the basis of pupil interest
5	6	1 hour	Conduct Student Orientation -Explain class procedures, care and replacement of supplies and equipment, and safety rules -Prepare all necessary forms	5	Program values, daily class procedures will be discussed; all necessary forms will be prepared
6	7	18 hours (9 weeks)	Conduct Individualized Program -Set-up individualized stations in the class -Familiarize each child with his prescribed tasks and stations	5	Individualized program focusing on specific disabilities and abilities will be conducted two or three times each week (in addition to the unrestricted program)

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			.Establish daily class procedures . Record dates and accomplishments on Individual Prescription Cards		
7	8	1 hour	Readminister the Motor Ability Test . Recompute percentiles, stanines and MAI scores	5	Students will be retested to determine progress
8	9	½ hour	Evaluate Individual Progress . Determine student progress on each test item and on the test battery (in terms of improvement as well as achievement)	6	Post-test results will be analyzed
9	10	18 hours (9 weeks)	Continue Program, Limited Improvement .Vary motor tasks to stimulate progress .Contact parents to urge home practice	6	Students evidencing limited progress will be scheduled for another nine-week period
9	11	½ hour	Release Students, Achievement of Minimal Standards .Release students who attain an MAI score of 50 or above, with no single index score of less than 40	6	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
1	5	4 hours	POSTURAL ABNORMALITIES: SCREENING BY STAFF	7	Students will be screened by physical education staff
1	2	2 hours	Administer Modified New York Posture Screening Test .Explain and demonstrate the purpose of the "screening" test . Set-up station (to include grid, stadiometer, disinfectant, basin, chair, object to be picked up) . Explain "screening" procedure: five at a time report to "screening" area; girls in swim suits; boys in shorts . Student assistant to check and record heights and weights . Record scores on student forms . Post test directions and sample forms	7	Students will be "screened" during the regular physical education period
2	3	1 hour	Identify Potential Scoliosis Cases . Students with lateral curvatures of the spine are to be measured in terms of leg length and scapulae displacement . Ascertain whether the problem is functional, or structural	7	Latural curvatures of the spine will be identified for further screening

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
2	3	½ hour	Compute Posture Scores ·Score each of the 13 items on a 7-4-1 basis ·Add a constant of 9 to each score total ·Circle composite scores of 70 or below and/or single item scores of 1	7	Self-explanatory
3	4	¼ hour	Refer to Physician' 70 or below, Component Score of 1 ·Fill out Teacher Referral Form and forward to the school nurse	7	Self-explanatory
3	5	¼ hour	Apprise Students of Minor Problems: No Referral ·Prescribe and implement exercises for minor problems in the unrestricted program	7	Self-explanatory
1	10		**POSTURAL ABNORMALITIES: REFERRED BY PHYSICIAN**	8-9	Family or school physician will examine and prescribe program
1	2	¼ hour	Procure Medical Form With Prescriptive Exercises ·Obtain medical form from the school nurse		Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
2	3	1 hour	Assess Static Posture ·Administer posture screening test · Scoliotic subjects: measure leg length and scapulae displacement · Record data on individualized prescription form	8	Baseline data will be gathered
2	3	¼ hour	Assess Dynamic Posture · Observe performance while the student walks, lifts and replaces an object, and sits and rises	8	Baseline data will be gathered
3	4	¼ hour	Prescribe Exercises Based on Medical Referral · Record exercises on individualized prescription form · Prescribe time allotments based on medical prescription	8	Exercises will be selected from pre-approved list furnished by the family or school physician
3	4	½ hour	Prescribe Tasks Focusing on Abilities · Determine pupil interests via an inventory · Post new activities that may interest the students · Prescribe selected activities for half the period	8	Tasks will be prescribed on the basis of pupil interest

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
4	5	1 hour	Conduct Student Orientation Program · Explain class procedures, care and replacement of supplies and equipment and safety rules · Prepare necessary forms	9	Program values, daily class procedure will be discussed; all necessary forms will be prepared
5	6	18 hours (9 weeks)	Conduct Individualized Program · Set-up individualized stations · Record dates and accomplishments on Individual Prescription Cards	9	Program will consist of activities prescribed on the basis of deficiencies and abilities
6	7	1 hour	Readminister Screening Test	9	Self-explanatory
7	8	½ hour	Evaluate Individual Progress · Compare pre- and post-test results	9	Post screening will be administered; results will be analyzed
8	9	18 hours (9 weeks)	Continue Program: Scores Below 85/1 · Encourage performance of exercises at home (solicit parental support) · Urge sound body mechanics in all daily tasks	9	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
8	10	½ hour	Refer to Physician For Release: Score Above 85, With No Single Component Score of 1 . Physician to reexamine and release or return to program.	9	Self-explanatory
1	11		**IMPLEMENT PROGRAM FOR STUDENTS WITH NUTRITIONAL DEFICIENCIES**	10-12	Students with nutritional problems will be programmed (based on medical examination)
1	2	¼ hour	Procure Medical Approval Form . Obtain medical form from the school nurse or family physician . Review personal and medical folders	10	Self-explanatory
2	3	½ hour	Administer Pryor Width-Weight Test . Measure chest and pelvic width . Determine "predicted" weight . Determine "true" weight . Compute "Nutritional Index"	10	Bone structure measurements will be taken (by students in grades 9-12)
2	3	½ hour	Determine Adipose Tissue Measurements . Measure arm, waist and scapulae deposits (right side of body)	10	Adipose tissue measurements will be taken (by students in grades 9-12)

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
2	3	½ hour	Determine Muscle Girth Measurements . Measure chest, bicep, abdominal and thigh circumferences	10	Muscle girth measurements will be taken (by students in grades 9-12)
3	4	½ hour	Determine Activity Needs to Gain or Lose ½ Lb. Per Week . Select daily activities to increase or decrease expenditure of energy by 250 calories	10	Self-explanatory
3	4	½ hour	Determine Caloric Needs to Gain or Lose ½Lb. Per Week . Apply Bogert's formula to compute Daily Caloric Intake (DCI) . Adjust DCI by 250 or 750 calories, depending on whether the intention is to lose or gain weight	10	Self-explanatory
3	4	½ hour	Prepare Weight Motivation Chart	10	Charts will be used by the students to record weekly weight changes
4	5	½ hour	Review Medical History	11	Self-explanatory
4	5	¼ hour	Review Somatotype Data . Record student's primary and	11	Student's body structure will be considered to establish a realistic weight

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			secondary somatotyping characteristics of his Individual Prescription Card		control goal
4	5	¼ hour	Review PFI Test Results	11	Data will provide additional information for writing a valid prescription
5	6	½ hour	Prescribe Tasks Based on Medical Referral and Assessment . Prepare individualized prescription tasks for the first half of the period	11	Self-explanatory
5	6	½ hour	Prescribe Tasks Focusing on Abilities . Determine pupil interest by an inventory . Post and introduce new activities that may motivate students . Prescribe selected activities for the second half of the period	11	Tasks will be prescribed on the basis of pupil interests
6	7	1 hour	Conduct Student Orientation . Differentiate between "obesity" and "over weight" . Discuss the misconceptions re-	11	Program values, daily class procedures will be discussed; all forms will be prepared

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			garding physical activity . Explain class procedures, care and replacement of supplies and equipment, and safety rules . Prepare all necessary forms		
7	8	18 hours (9 weeks)	Implement Individualized Program . Familiarize each student with the "overload" principle, his specific exercises and the benefits derived . Record dates and accomplishments on Individual Prescription Cards	12	Individual prescriptions will be written for each participant
8	9	1½ hours	Retest and Evaluate Individual Progress . Compare pre- and post-test results in light of somatotype	12	Individual progress will be evaluated at nine-week intervals
9	10	18 hours (9 weeks)	Continue Program: Nutrition Index (NI) Above Or Below 10% . Reevaluate activity and eating habits with student . Encourage parental support . Represcribe activity and food intake	12	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
9	11	½ hour	Refer to Physician For Release: N.I. Within 10% of Predicted Weight . Physician to reexamine, release, or return to the program	12	Self-explanatory
1	10		**IMPLEMENT PROGRAM FOR CHILDREN WITH MENTAL RETARDATION OR LEARNING DISABILITIES**	13-14	Children with mental retardation or learning disabilities, who are referred by the Child Study Team and medical inspector, will be provided physical activity programs commensurate with their needs
1	2	¼ hour	Procure Child Study Team And Medical Approval Form · Obtain proper form, with prescriptive tasks	13	Self-explanatory
2	3	1 hour	Review Permanent Record And Medical History · Discuss each child with the special educator, learning disability specialist, and school nurse	13	Review of the records and medical history will provide adjunctive prescriptive information

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
2	3	½ hour	Review Physical Fitness and Motor Ability Test Results · Record Physical fitness and motor deficiencies	13	Self-explanatory
2	3	2 hours	Administer Perceptual-Motor Screening Tests · Test to ascertain whether problems are perceptual response, or integrative motor response · Test to ascertain whether perceptual response problems are auditory, visual, etc.	13	The screening tests will provide insight as to the types of physical activities that are to be prescribed
2	3	part of time above	Assess Performance Subjectively · Record anecdotal remarks on prescription card	13	Performance will be assessed to note "process" problems
3	4	1 hour	Compute Norm Scores And Assess Performance Objectively · Record all objective scores on prescription card · Convert raw scores to norm scores	13	Raw scores, norm scores and criterion-referenced norm scores will be recorded
4	5	1 hour	Prescribe Tasks Approved by the	13	Child Study Team will submit recom-

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			"Team" · Design tasks to increase "attention span," improve perceptual-motor ability and to enhance cognition and academic achievement (half the period)		mended tasks with their participation approval form
4	5	½ hour	Prescribe Tasks Focusing on Abilities · Design games where each child is afforded the opportunity to be the "leader" · Permit the students to go to the activity station of their choice (half the period)	13	Tasks that focus on abilities will be included to enhance the child's self-concept
5	6	½ hour	Conduct Student Orientation · Explain class procedures, care and replacement of supplies and equipment and safety rules · Prepare all necessary forms	14	Daily class procedures will be discussed
6	7	18 hours (9 weeks)	Implement Individualized Program · Set-up a teaching station for each "factor" such as eye and hand coordination · Start entire class on a "set" rou-	14	Each child's program will be designed commensurate with his needs

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			tine and then take one child at a time through his "specific" routine · Assign some students as partners so that as one performs, the other provides feedback · Design group activities for the second half of the period to enhance socialization		
7	8	1½ hours	Retest and Evaluate Individual Progress · Retest, compare pre- and post-test scores · Analyze data in terms of achievement as well as improvement	14	Progress will be evaluated every nine weeks
8	9	18 hours (9 weeks)	Continue Program: Motor Ability Index Below 40 · Encourage parents to work with their child on his prescription at home · Revise prescription if motivation is lacking · Discuss possible task modifications with the "team"	14	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
8	10	½ hour	Refer to Child Study Team or Physician For Program Release: MAI Above 40 -"Team" to approve release, or return to program **Note:** Student may be retained in the program, regardless of MAI score, if the teacher feels he needs additional work in perceptual-motor tasks	14	Self-explanatory
1	11		**IMPLEMENT PROGRAM FOR CHILDREN WITH BREATHING PROBLEMS**	15-16	Diaphragmatic breathing exercises will be prescribed for those students who receive medical permission to participate
1	2	¼ hour	Procure Medical Approval Form	15	Self-explanatory
2	3	1 hour	Review Permanent Record and Medical History	15	Self-explanatory
2	3	1 hour	Administer Vital Capacity Test -Test to be administered at the be-	15	Vital capacity volume will be indicative of the volume of air expirated

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			ginning and end of each period to determine tolerance to the prescribed activity		
2	3	part of time above	Assess Performance Subjectively ·Record anecdotal remarks on student's prescription card regarding performance peculiarities	15	Self-explanatory
3	4	½ hour	Record Objective Test Data on Profile Sheet · Draw a line to connect each period's pre-test score · Record daily pre- and post-test scores	15	Profile data will provide a "visual picture" of student progress in terms of air expirated
4	5	½ hour	Prescribe Exercises Approved by the Physician ·Prescribe diaphragmatic and aerobic breathing exercises and activities (half the period) **Note:** Inform student he is to cease performance when he has extreme difficulty breathing	15	Students will be admitted to the program only upon approval of the family or school physician

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
4	5	½ hour	Prescribe Activities Based on Abilities •Post a list of available tasks and activities (based on student interest inventory) •Prescribe student-selected tasks and activities for half the period	15	Self-explanatory
5	6	½ hour	Conduct Student Orientation •Explain class procedures, care and storage of supplies and equipment and safety rules •Post a sample sheet of scores that have been plotted •Prepare the necessary class forms	16	Self-explanatory
6	7	18 hours (9 weeks)	Implement Individualized Program •Set-up stations within the class for cycling, rope skipping, running-in-place, "step testing," and "jumping jacks" •Prepare a list of times and dates the gym is available for activities such as handball, basketball, tennis, table tennis, etc. •Record daily pre- and post-test VC scores and increased "circuits" performed	16	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
7	8	1½ hours	Retest and Evaluate Individual Progress . Retest, compare pre-test scores on the first and last day of the period · Record other data such as comparison of pre- and post-medical dosage, number and severity of "attacks," etc.	16	Self-explanatory
8	9	18 hours (9 weeks)	Continue Program: Vital Capacity 25% Below Norm · Counsel students to discuss the possible reasons for lack of improvement · Discuss the problem with the medical team and parents for possible insight · Represcribe activities if deemed necessary	16	VC score of 25% below the average score for the age group is indicative of sub-par performance
8	10	½ hour	Recommend Flexible Scheduling: Vital Capacity Score 15% Below Norm · Schedule students in the unrestricted program for those activities that are not extremely vigorous	16	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
8	11	½ hour	Refer to Physician For Program Release: · Physician to approve readmittance to the unrestricted program **Note:** Release should be recommended *only* after student VC scores have been "normal" for a two or three week period	16	Self-explanatory
1	5		**IMPLEMENT PROGRAM FOR STUDENTS WITH MOTOR DISABILITIES OR LIMITATIONS**	17-18	Self-explanatory
1	2	¼ hour	Procure Medical Approval Form **Note:** Medical forms are to be filed in the nurse's office; a copy of the form is to be placed in the child's folder	17	Self-explanatory
2	3	1 hour	Review Permanent Record and Medical History · Record pertinent data in teacher's register	17	The D&A teacher will review the permanent record and medical history of every student in the program

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			• Discuss the child's problem(s) with the Child Study Team		
2	3	2 hours	Administer Muscle Girth and Strength Decrement Index Tests (SDI) • Pair students for testing • Take muscle girth measurements with muscles contracted • Administer strength test at the beginning and end of testing period (with exercise regimen between)	17	Students will identify their "tolerance" limits
2	3	2 hours	Administer Physical Fitness and Motor Ability Items • Keep a record of pre- and post-test progress	17	Students will be encouraged to perform those tasks that are within their ability levels
2	3	1 hour	Administer Range of Motion Tests • Use goniometer or flexometer to determine range of motion of joints	17	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
2	3	part of time above	Assess Performance Subjectively · Keep record of anecdotal remarks that will assist in final evaluation	17	Self-explanatory
3	4	½ hour	Record Objective and Subjective Data	17	Self-explanatory
4	5	½ hour	Prescribed Exercises Approved by the Physician · Provide test data and suggested exercises for the physician's consideration	17	The family or school physician *will prescribe* all exercises
4	5	½ hour	Prescribed Activities focusing on Abilities · Administer student interest inventory · Post a list of modified games and activities that have been approved by the physician	17	The family or school physician *will prescribe* all games and activities
5	6	½ hour	Conduct Student Orientation · Explain the "why" of each exercise and task prescribed for each child · Demonstrate the correct testing	18	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			techniques · Assist in testing · Explain daily class procedure · Prepare the necessary forms		
6	7	18 hours (9 weeks)	Implement Individualized Program · Record all data in individual folders to reflect the format: test, assess, prescribe, evaluate	18	Each student will receive a program based on *his specific needs and interests*
7	8	1½ hours	Retest and evaluate Individual Progress · Refer students to physician for possible release from program (where results are supportive of such a recommendation)	18	Students will be retested at nine-week intervals
8	9	18 hours (9 weeks)	Continue Program · Consideration should be given to possible revision of exercises stimulation of motivation, etc.	18	Self-explanatory
8	10	½ hour	Recommend Flexible Scheduling · Prepare and submit supportive evidence for your recommendation · Prepare a list of games and activi-	18	Students who can perform certain games and activities in the unrestricted program will be scheduled accordingly

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			ties for student participation when assigned to the unrestricted program		
8	11	½ hour	Refer to Physician for Program Release Prepare and submit supportive evidence for your recommendation	18	Students will not be returned to the unrestricted program unless they have a signed release from the family or school physician
1	11		**IMPLEMENT PROGRAM FOR STUDENTS WITH COMMUNICATION DISORDERS**	19	D&A Program will be provided for the partially-sighted, blind, hard-of-hearing, deaf, and autistic
1	2	¼ hour	Procure Medical Approval Form **Note:** The original form is to be filed in the nurse's office; a copy of the form is to be placed in the child's folder	19	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
2	3	1 hour	Review Permanent Record and Medical History · Carefully check auditory and visual information	19	The D&A teacher will review the permanent record and medical history of every student in the program
2	3	2 hours	Administer Physical Fitness and Motor Ability Items · Keep a record of pre- and post-test progress	19	Students will be encouraged to perform those items that are within their ability levels
2	3	1 hour	Administer Other Appropriate Tests · Where appropriate, devise tests to assess peripheral vision, depth perception, and kinesthesis	19	Tests designed to assess progress in terms of "use of the senses" will be administered
2	3	Part of time above	Assess Performance Subjectively	19	Self-explanatory
3	4	½ hour	Record Objective and Subjective Data	19	Self-explanatory
4	5	½ hour	Prescribe Exercises Approved by the Physician · Record prescribed exercises on each student's prescription card	19	The family or school physician *will* prescribe all exercises

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
4	5	½ hour	Prescribe Activities Focusing on Abilities · Post a list and discuss modified games and activities that have been approved by the physician or Child Study Team	19	The family, or school physician or Child Study Team will prescribe all games and activities
5	6	½ hour	Conduct Student Orientation · Explain rules and regulations, program values, etc. · Demonstrate correct testing technique · Prepare the necessary forms · Assist and conduct testing **Note:** Autistic children should be guided through all tests	20	Self-explanatory
6	7	18 hours (9 weeks)	Implement Individualized Program · Provide an aide to work with each autistic child, utilize immediate, positive reinforcement for the slightest accomplishment	20	Each student will receive a program based on *his specific needs and interests*
7	8	1½ hours	Retest and Evaluate Individual Pro-	20	Students will be retested at nine-week

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			gress · Refer students to physician for possible release from the program (where results are supportive of such a recommendation)		intervals
8	9	18 hours (9 weeks)	Continue Program · Consideration should be given to possible revision of exercises; stimulation of motivation, etc.	20	Self-explanatory
8	10	½ hour	Recommend Flexible Scheduling · Prepare and submit supportive evidence for your recommendation	20	Where possible, students will be scheduled in with their peer group
8	11	½ hour	Refer to Physician For Program Release · Prepare and submit supportive evidence for your recommendation	20	Students will not be returned to the unrestricted program unless they have a *signed release* from the family or school physician

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
1	16	36 weeks	**ORGANIZATION AND ADMINISTRATION OF A PHYSICAL EDUCATION PROGRAM FOR THE HANDICAPPED**	21-25	Self-explanatory
1	2	2 days	**I. SCHOOL ORIENTATION**	21	General school orientation will be held at the beginning of the school year
1	2	1 day	Meet School Personnel • Meet with the following school personnel: principals, school physician(s), nurses, learning disability specialists, classroom teachers, the Child Study Team, physical education staff, and other D&A teachers	21	Self-explanatory
1	2	3 hours	Acquire Class and Staff Schedules • Prepare a list of students who are to be scheduled in D&A • Prepare a list of students who are to be "screened" as potential candidates • Contact Child Study Team Coordinator for a list of "Classified" students	21	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			· Contact school physician or nurse for medical referrals		
1	2	3 hours	Check Supplies, Equipment and Facilities · Inventory supplies and equipment · Prepare and submit list of emergency items needed · Check D&A teaching station(s) available	21	Inventory and review of facilities will be conducted to determine additional emergency supply and equipment needs and to determine teaching stations available
2	3	2 days	**II. ORIENTATION OF PROGRAM DIRECTOR**	21	General orientation will be conducted by the D&A Program Director during the first week of school
2	3	2 hours	Procure and Review D&A Lists · Update the D&A list by adding the names of late referrals	21	Lists of students in the D&A Program during the past school year (who are recommended for program continuance will be provided by the Director)
2	3	4 hours	Procure and File Summer School Folders in Each School	21	Individual folders will be kept of students in the summer D&A Program

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			· Review individual folders · Update current D&A lists · File folders in proper school(s)		
2	3	1 day	Establish D&A Council and Review Policies and Procedures · Establish a D&A Council to include principals, school physician, school nurses, Child Study · Team Coordinator, learning disability specialists, guidance department chairman, D&A teachers and D&A Director · Prepare policies for board approval · Review existing policies · Discuss program implementation; review teaching methods, program content, evaluative procedures	21	D&A Council will be established to approve of all program policies
3	5	5 days	**III. PLAN AND REVIEW D&A SCHEDULE**	22	Self-explanatory
3	4	1 day 2 hours	Contact Parents and Physicians for D&A Program Approval	22	D&A Program participation will require parental and physician's approval

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			· Contact parents for permission for students to be scheduled in the Developmental Program · Secure medical permission forms for students to be scheduled in the Adapted Program · Secure prescriptions by the Child · Study Team for "classified" students who are to be scheduled		
3	4	4 hours	Revise and Share D&A List with School Personnel · Make final revisions of D&A list based on parental and physician contacts · Duplicate D&A list and forward to all D&A Council members and to teachers of students scheduled	22	Self-explanatory
3	4	1 day	Develop "Rotation Block" Teaching Scheduling · Limit class size to ten students · Plan schedule so that students are scheduled on a "block time basis" (i.e., two to three times per week)	22	Rotating schedule will be developed so that students do not miss the same subjects each week

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			· Plan rotating schedule so that students do not miss the same period more than once a week · Where possible, group students according to classification and grade · Provide for one period per week for testing and contacting parents · Meet with principal to discuss general scheduling plan		
4	5	1 day	Review Permanent and Medical Records of Students Scheduled . Record pertinent anectodal remarks in class register	22	Self-explanatory
4	5	1 day	Review, Revise Teaching Schedule with Staff	22	Self-explanatory
4	5	Part of time above	Submit Finalized Plan for Principal's Approval . Duplicate and disseminate the teaching schedule to all Council members and to teachers of the students scheduled	22	Teaching schedules will be approved by the building principals

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
5	8	2 days	IV. D&A PROGRAM PRELIMINARIES	23	Prior to program implementation, the D&A teacher will complete all preliminary details
5	6	1 hour	Forward Student Composite Forms to Director and Child Study Team Coordinator · On composite form, record student's name, grade, date admitted, classification, and the person making the referral	23	A composite list of all students in the D&A Program will be kept on file in the office of the D&A Director and the Coordinator of the Child Study Team
6	7	3 hours	Send Initial Progress Report Forms Home to Parents . On forms, record reason for referral, the staff member making the referral, and test scores . List exercises that can be performed at home	23	Self-explanatory
6	8	1 hour	Regroup Folders of Students Continuing in the program · Regroup folders on the basis of the teaching schedule	23	Individual folders will be prepared for each student in the program

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			· Forward folders of students transferring schools within the district		
6	8	1 hour	Establish Procedures for Picking Up and Releasing Students · Arrange with classroom teachers procedures for picking up and releasing students each day	23	Self-explanatory
6	8	1 day	Set-Up Individualized Teaching Areas Within Each Teaching Station · Set-up an area for each motor ability factor · Install a posture grid and overhead ladder in each station	23	Each child will be provided an individualized program based on his specific needs
8	13	32 weeks 2 hours	**V. PROGRAM IMPLEMENTATION**	24	Self-explanatory
8	9	2 hours	Conduct Student Orientation . Fill out all necessary forms, individual prescription cards and individual folders . Somatotype all students · Write individual prescriptions so	24	Each student will receive detailed explanation of "why" he was scheduled and the values he will derive from participation

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			that half the period is devoted to eliminating and ameliorating disabilities, and half the period is devoted to activities that focus on abilities		
9	11 and 12	32 weeks	Implement Developmental and Adapted Program (General) · Prescribe and individualize programs on the basis of "TAPE" (i.e., test, assess, prescribe and evaluate) · Test new students upon admittance · Retest all students at nine-week intervals . Release students in Developmental Program upon achievement of minimal standards (fill out and distribute Teacher Referral Forms) . Refer students recommended for release from the Adapted Program to the proper authorities . Where recommended and feasible, set-up "flexible" student scheduling	24	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
11	13	part of time above	Implement Low Motor Ability and Low Physical Vitality Programs	24	
12	13	part of time above	Implement Programs for Postural Abnormalities, Nutritional Deficiencies, Mental Retardations/Learning Disabilities, Motor Disabilities/Limitations, Breathing Problems, and Communication Disorders	24	
10	11	on-going	Scheduling New Students and Releasing Students •Procure Teacher Referral, Medical Excuse, and Posture Evaluation Forms from the nurse's office (nurse to contact parents and family physician for permission) •High school procedures for scheduling students: –department chairman prepares "admission passes" and places in staff mailbox –D&A teachers send D&A students to study hall to pick up new student (study hall teacher to sign pass and record information on class attendance records)	24	Students who are referred, or medically excused for more than a month, will be admitted to the program

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			. High school procedures for releasing students: —student completes Student Evaluation Form —teacher completes individual Progress Report Form (with indications of improvement and recommendation) —teacher forwards all forms to the department chairman so that data can be transferred to permanent record cards —student is returned to study hall (study hall teacher signs pass)		
10	12	on-going	. Elementary school procedures for scheduling students: —procure Teacher's Referral, . Posture or Medical Excuse Forms from nurse's office —pick up student from his classroom . Elementary school procedures for releasing students —fill out Teacher Referral Form and forward to the building principal —principal to duplicate Referral	24	Self-explanatory

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			Form and forward copies to the classroom teacher, school nurse, etc.		
13	16	2 weeks	**VI. SCHOOL CLOSING PROCEDURES**	25	Self-explanatory
13	14	1 week	Release Students . All students are to be released from the program one week prior to the end of school year	25	Subject to the approval of the building principal
13	14	3 hours	Clean-Up Teaching Station · Remove materials from bulletin boards · Submit work orders for needed repairs and improvements	25	Self-explanatory
13	14	1 day	Prepare and Forward End-Of-Year Reports to the Program Director . Submit progress report of each student in the program (pre- and post-test scores, etc.) . Submit list of students to be scheduled the following year (in-	25	Teachers will be required to prepare and submit all end-of-year reports during the last week of school

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
			clude names, grades and classifications) . Submit cost analysis report for each "classified" student		
13	14	3 hours	Prepare and Forward End-Of-Year Reports to Parents . For those students recommended for program continuation, include a request for parental permission	25	Self-explanatory
13	14	3 hours	Prepare and Submit Annual Inventory and Budget Requests	25	Self-explanatory
13	14	3 hours	Prepare and Submit a List of Potential Summer School D&A Candidates · Select high school students to be used as teacher aides · Submit a "quota" from each elementary school on a priority basis (contact "Team" members) · Obtain principal's approval of the list	25	Summer school participation will be determined on a priority basis

ACTIVITY CHECKLIST

EVENT NUMBERS		ACTIVITY TIME	ACTIVITY DESCRIPTION	NETWORK NUMBERS	EXPLANATION
BEGINNING	ENDING				
14	15 and 16	2 days	Program Director Edits and Synthesizes All Reports and Forwards Copies to the Superintendent of Schools and Board of Education and to the D&A Council . Prepare Kindergarten through Grade 12 D&A list for the following year · Prepare annual inventory and budget request reports · Prepare a list of students for summer program · Update all D&A Cumulative Record Cards · Prepare a cost analysis report for all "classified" students in the program and submit to the Board Secretary	25	Self-explanatory

SECTION II
PROGRAM IMPLEMENTATION

CHAPTER FOUR

DEVELOPMENTAL PROGRAM

LOW PHYSICAL VITALITY

DEFINITION

Low physical vitality is defined as a deficiency in arm strength, abdominal strength, leg strength, cardio-respiratory endurance, or a composite deficiency thereof. Students with a Physical Fitness Index (PFI) of 35 or below (approximately the bottom ten per cent of the population tested), or a single achievement score of 20 or below (approximately the bottom five per cent of the population tested) are to be classified as evidencing *Low Physical Vitality*.

BEHAVIORAL OBJECTIVES

1. The student attains a minimum average standard score of 50 on the Township of Ocean Physical Fitness Test Battery (with no single component stanine score of less than 4), or a score that is satisfactory in terms of his somatotype (grades 1-12.)
   Evaluative criteria: self-evident. (Student performance to be assessed by the teacher for grades 1-6 and by the partner for grades 7-12.)
2. The student identifies his primary and secondary somatotyping characteristics so that he can establish an aspiration level commensurate with his body structure (grades, 9-12).
   Evaluative criteria: material distributed in class. (Student performance to be assessed by the partner.)
3. The student computes his stanine scores and time prescriptions, and identifies his weaknesses and strengths on a continuum (grades, 9-12).
   Evaluative criteria: materials distributed in class. (Student performance to be assessed by the teacher.)
4. The student demonstrates the correct techniques for performing the static arm hang, modified sit-ups, standing broad jump and modified Harvard Step Test (grades 7-12).
   Evaluative criteria: directions in "Test" sub-section. (Student performance to be assessed by the partner.)
5. The student reflects an increasingly positive self-concept, or attitude toward physical activity as indicated by pre- and post-test scores (Self-Concept Pictorial Scale,[1] grades 1-4, or Wear Attitude Inventory,[2] grades 5-12).
   Evaluative criteria: ten percent gain in raw score. (Student performance to be assessed by the teacher.)

TEST

Administration Procedures for Physical Fitness Test[3]

Presented in sequence are test directions, test form and a suggested parental reporting form.

Test Directions

Test Item No. 1: *Static arm hang*
Factor: Arm and Shoulder Strength

After demonstration, the subject is assisted to the starting position (with arms flexed and chin above bar). The subject is not allowed to touch any part of his head to the bar, to kick, struggle, or move his body. Palms are to face away from the body. Special efforts are to be made to keep the subject in the starting position, especially as he begins to tire. The score recorded is the *number* of seconds from the signal "go" (starting position) until

[1] Angelo S. Bolea, Donald W. Felker and Margaret D. Barnes, *Journal of Education Measurement*, pp. 223-224.

[2] C.L. Wear, *Research Quarterly*, pp. 113-119.

[3] "Annual Physical Fitness Test," Township of Ocean School District, Oakhurst, N.J.

the arms are "locked" completely straight (finished position).

Attempts: 1 Scoring: Total suspension time in seconds

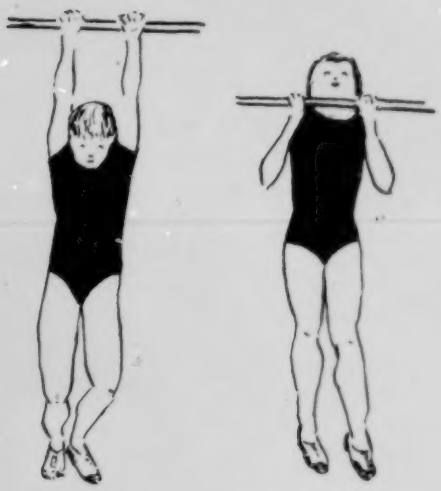


Fig. 4-1 Static Arm Hang

Test Item No. 2: *Modified sit-ups (curl-ups)*
Factor: Abdominal Strength

After demonstration, the subject assumes a supine position on a mat, with arms straight and palms resting on the thighs. On the command "go," the subject raises his head and shoulders and slides his hands forward until he touches the upper edges of his kneecaps; he, then, immediately returns to the supine position. To increase reliability and objectivity, the instructor places his hand across the child's kneecap and counts as the child touches his arm.

Fig. 4-2 Modified Sit-Ups

The subjects are not permitted to "bounce" up, raise hands off legs, or rest between curl-ups (stress a steady rhythm). The score recorded is the number of times the student touches the extended arm properly. Repeat the count when performed incorrectly.

Attempts: 1 Scoring: Total correct curl-ups

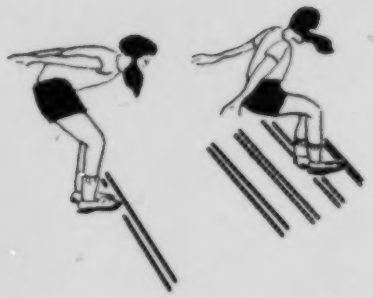


Fig. 4-3 Standing Broad Jump

Test Item No. 3: *Standing broad jump*
Factor: Explosive Leg Power

After demonstration, the student stands with his toes behind the take-off line, his feet several inches apart. He is to jump as far forward as possible. Before jumping, he bends his knees and swings his arms forward. No restrictions are placed on his arm movements. However, the student is informed the jump will not count if he falls backward. The score recorded is the best jump of three attempts, measured and *recorded in total inches*. Measurements are taken from the back of the take-off line to the back of the heel nearest the take-off line. The scorer should stand to the side of the subject to observe the exact point of contact of the rear heel.

Attempts: 3 Scoring: Best distance recorded in inches

Fig. 4-4 200 Yard Run

Test Item No. 4: *200 yard run; 8-minute run; 12-minute run*

Factor: Cardiorespiratory Endurance

a. 200 yard run, ages 6-11 (grades 1-6)

After demonstration of the sprint start, the students are requested to assume the starting position with fingertips behind the starting line. Commands are: "take your mark;" "get set;" and "go." The instructor should start the time when the subject "moves" rather than on the command "go." Encourage the students to run at full speed beyond the finish line. If a student does not run as fast as he can, do not record his score, as the time will be invalid. For consistency, run the

200 yard dash in a straight line (preferably on turf). Gym shoes or shoes may be worn; stockings or bare feet are not permitted.

Attempts: 1 or more, if necessary. Scoring: Time in seconds ..

b. 8-Minute run, ages 12-13 (grades 7-8)

(1) Sub-divide the 440 yard track into eight equal sections 55 yards each section. (2) Place a flag marker at each section, e.g., "1," "2," "3," etc. (3) "Pair" all students as "1's" and "2's," prior to testing. (4) On command have all of the "1's" (half the class) run for an 8-minute period. The number 2's are to keep a record of the distance covered by their partners. (5) At the termination of the 8-minute period, the instructor blows the whistle, terminating the run. The number 2's report their partner's scores to the recorder, e.g., 3.6 would indicate three complete laps, plus the passing of six markers. (6) Reverse the procedure and have the number 2's run and the number 1's act as recorders.

Attempts: 1 Scoring: Total laps, plus flags passed in 8 minutes

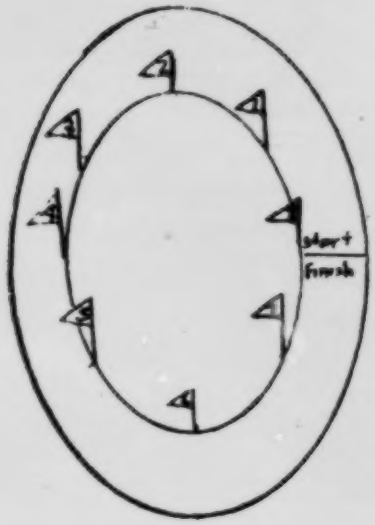


Fig. 4-5 8-Minute Run

c. 12-Minute run, ages 14-18 (grades 9-12)

The same test directions as for the 8-minute run except that the students continue running for a 12-minute period.

Attempts: 1 Scoring: Total laps, plus flags passed in 12 minutes.

Note: Percentile tables are located at the end of the chapter.)

Administration procedures for self-concept scale and attitude inventory.

Administer Form A of the Self-Concept Pictorial Scale to students in grades 1-4 and Form A of the Wear Attitude Inventory to students in grades 5-12. (Refer to Appendix 11 for Self-Concept materials and Appendix 12 for the Wear Attitude Inventory information.)

Recording Form

Record raw scores in Table 4-1. Use tables provided in class to convert raw scores to percentile scores; enter in Table 4-1. Compute Physical Fitness Index (PFI) score. Student learning experience: checking accuracy of partner's raw, percentile, stanine, and PFI scores, grades 9-12. (Refer to Table 4-2 for a Parental Reporting System.)

Test Scoring

The Township of Ocean Physical Fitness Test Form (Table 4-1) presents items that measure: arm and shoulder strength; abdominal strength; explosive leg power; and cardiorespiratory endurance. The student's raw score in each area, plus anecdotal remarks describing how the task is performed, should be recorded in the appropriate "raw score" column. (Three "raw score" columns have been provided for the recording of test scores administered at periodic intervals.)

The raw scores will later be converted into percentile scores, stanine scores and a PFI score so that a student's performance can be appraised in terms of his or her age and sex.

ASSESSMENT

Physical fitness and motor ability profile sheet.

Record stanine scores on Table 4-3.

Student learning experience: plotting own stanine scores on profile sheet, grades 9-12.

Physical fitness time prescription chart.

Convert stanine scores to time prescriptions via use of Tables 4-3 and 4-4. (Total prescription time should be one-half of the activity period.)

Objective appraisal.

Record individual prescriptions on Table 4-5. Also record self-concept data.

TABLE 4–1

PHYSICAL FITNESS TEST FORM (Courtesy of the Township of Ocean School District)

NAME Jane Doe AGE 13 INSTRUCTOR Mrs. P. Galatro
SCHOOL Ocean Township School MALE _____ FEMALE x
GRADE 8 HEIGHT 5'4" WEIGHT 135
STARTED PROGRAM: Date September 74
COMPLETED PROGRAM: Date _____ SOMATOTYPE Endo-Mesomorph

TEST ITEM	FACTOR	RAW SCORE			PERCENTILE			STANINE		
		Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
Static Arm Hang	Arm Strength	24 Sec.	Sec.	Sec.	65			6		
Modified Sit-Ups	Abdominal Strength	30			40			5		
Standing Broad Jump	Leg Strength	53"	in.	in.	4			2		
200 Yard[1] Dash	Endurance	Sec.	Sec.	Sec.						
8-Minute[2] Run	Endurance	1.6			0			1		
12-Minute[3] Run	Endurance									
	Number of Tests							Total Points		
TOTALS	4							14		

PFI = $\frac{\text{Total Stanines} \times 10}{\text{Number of Tests}}$ $\frac{14 \times 10}{4} = 35$ PFI Score

Anecdotal Remarks

Supports body weight primarily with the right arm. Favors the right side of the body when performing modified sit-ups.

Table for Converting Percentiles to Stanines

Percentile Intervals	Stanines	
97 and above	9	Very High
90–96	8	
80–89	7	High
65–79	6	
35–64	5	Average
20–34	4	Low
10–19	3	
4–9	2	Very Low
3– and below	1	

[1] Administered to students, ages eleven and below.

[2] Administered to students ages twelve and thirteen.

[3] Administered to students ages fourteen and above.

PARENT'S SIGNATURE _____

PARENT WISHES CONFERENCE ( )

TEACHER/PARENT COMMENTS

TABLE 4-2
PARENTAL REPORTING FORM

Physical Education

Grades 1 - 8

Report of Pupil Progress

Pupil _____

Grade _____ Year _____

Classroom Teacher _____

Dear Parent:

The Township of Ocean Physical Fitness Test is administered twice a year in all physical education classes, grades one through twelve.

The purpose of the fall test is to identify weak areas so that activities can be prescribed accordingly. The spring test provides a basis for determining progress.

Compare your child's fall and spring scores with the District norms to determine his/her relative status and progress.

Assistance will be available by contacting the Physical Education Staff in your school.

TEST PERFORMANCE

FALL	SPRING	
sec.	sec.	Flexed Arm Hang– Measures arm strength
		Sit-up – Measures abdominal strength
inches	inches	Standing Broad Jump– Measures leg power
sec.	sec.	200 Yard Run– Measures endurance

Please use the back of this report for comments.

TABLE 4-2 (Continued)

PARENTAL REPORTING FORM, AGES 6–11

(Courtesy of the Township of Ocean School District)

GIRLS

DISTRICT NORMS					
STUDENT AGE	%	ARM HANG	SIT–UPS	STANDING BROAD JUMP	200 YD. DASH
6	75	15	28	43	43
	50	10	17	38	48
	25	7	11	34	52
7	75	20	37	48	41
	50	13	25	45	44
	25	8	20	40	46
8	75	24	43	51	38
	50	16	30	48	42
	25	11	20	45	46
9	75	28	59	53	37
	50	17	37	49	39
	25	9	27	45	42
10	75	25	81	56	35
	50	15	50	51	37
	25	9	35	48	39
11	75	33	98	64	33
	50	21	60	60	36
	25	13	41	52	41

TABLE 4-3

PHYSICAL FITNESS AND MOTOR ABILITY PROGRESS PROFILE (Courtesy of the Township of Ocean School District)

STUDENT'S NAME _____ AGE _____ CLASSIFICATION _____ SCHOOL _____
Last First

Symbols		COMPONENT MEASURED											
1st Test Solid Line 2nd Test Dotted Line Standard Score		STATIC ARM HANG	MODIFIED SIT-UPS	STANDING BROAD JUMP	CARDIORESPIRATORY ENDURANCE	GROSS BODY COORDINATION	BALANCE POSTURAL ORIENTATION	EYE AND HAND COORDINATION	EYE AND HAND ACCURACY	EYE AND FOOT ACCURACY	AVERAGE STANDARD SCORE	Standard Score
EXCEL	90											90
	80											80
GOOD	70											70
	60											60
FAIR	50											50
	40											40
POOR	30											30
	20											20
INFER	10											10

ANECDOTAL REMARKS

N.Y. Posture Screening Test ____ ____
Asthmatic (Vital Capacity) ____ ____
Weight Control (lbs.) ____ ____
Orthopedic (See Anecdotal Remarks) ____ ____

TABLE 4–4

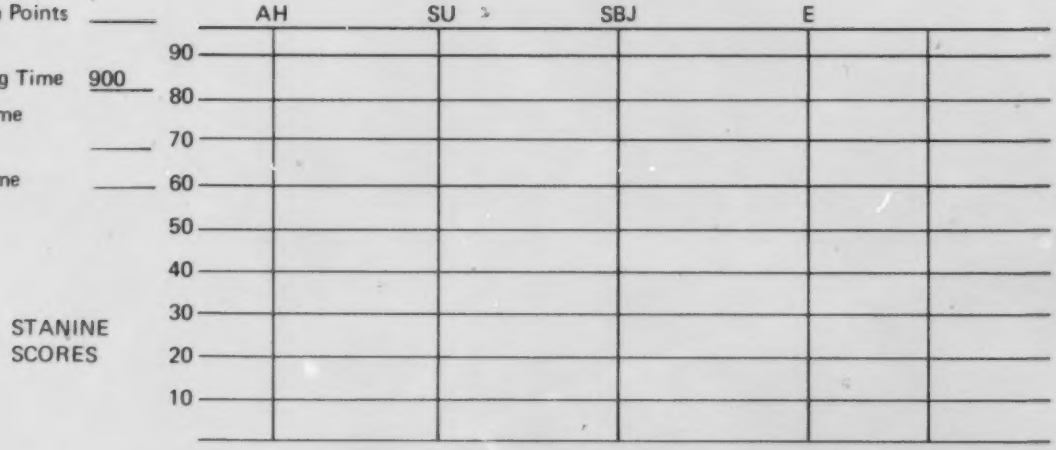
PHYSICAL FITNESS TIME PRESCRIPTION CHART

Total Deviation Points Below 90 _____

Total Exercising Time 900

Prescription Time Multiplier _____

Adjustment Time _____



	Arm Hang	Sit-ups	Standing Broad Jump	Endurance	Total
Deviation Points Below 90					
Prescription Time Multiplier					
Sub Total					
Adjustment Time					
Total Prescription Time Per Exercise (In Seconds)*					
In Minutes and Seconds					

*To determine prescription time for each factor: (1) find prescription time multiplier by dividing total exercising time (900 seconds) by total stanine points below 90 (drop all decimals in the multiplier) (2) multiply deviation stanine points for each factor by the prescription time multiplier; (3) add adjustment time to the lowest factor; (4) total prescription time in seconds; and, (5) convert times to minutes and seconds.

(Source: Thomas M. Vodola, "The Effects of Participation Time Variations on the Development of Physical Fitness, Motor Skills and Attitudes," unpublished doctoral dissertation, Temple University, 1970, p. 150.)

TABLE 4-5

INDIVIDUAL PRESCRIPTION CARD (Courtesy of the Township of Ocean School District)

NAME _____ DAY____ PERIOD_____ INSTRUCTOR _____ SCHOOL _____

CLASSIFICATION _____

MOTOR SKILLS	PARTICIPATION	SCORES
Bilaterality		
Balance–Postural Orientation		
Eye and Hand Coordination		
Eye and Hand Accuracy		
Ocular Pursuits		
Eye and Foot Accuracy		
PERCEPTUAL MOTOR SKILLS		
Auditory Response Skills		
Auditory–Motor Skills		
Visual Response Skills		
Visual Motor Response Skills		
Audio Visuo Motor Response Skills		
ORTHOPEDIC PROGRAM		
Range of Motion Exercises		
Strength Exercises		
DATES		

Handedness R L Footedness R L

Remarks _____ Somatotype _____

Self Concept/Attitude Pre: Post:

NAME _____ DAY____ PERIOD_____ INSTRUCTOR _____ SCHOOL _____

CLASSIFICATION _____

PHYSICAL FITNESS	SCORING	
Push-ups	Reps.	
Pull-ups	Reps.	
Sit-ups	Reps.	
Static Arm Hang	Seconds	
Rope Skip (1 Minute)	Reps.	
POSTURE EXERCISES	DATES	
Bridging (Kyphosis)	Reps.	
Ladder Swing (Scoliosis)	Reps.	
Lateral Stretch (Scoliosis)	Reps.	
Knee Squeezes (Lordosis)	Reps.	
ASTHMATIC SERIES	SETS	
WEIGHT CONTROL EXERCISES	DATES	
Jumping Jacks (100)	Sets	
Hop Both Feet (100)	Sets	
Hop Right Foot (100)	Sets	
Hop Left Foot (100)	Sets	
Run in Place (100)	Sets	

Posture Tests _____ _____ _____ Vital Capacity _____ _____ _____ Weight _____

REMARKS _____

NOTE: Suggested exercises for medical problems are subject to approval of the medical inspector.

93

Student learning experience: recording own time prescriptions on prescription card, grades 9-12.

Subjective appraisal.

Determine subject's primary and secondary somatotyping characteristics. (Refer to Chapter Seven for somatotyping characteristics.) Record somatotyping characteristics (primary and secondary components) and anecdotal remarks regarding subjective appraisal on Individual Prescription Card.

Student learning experience: somatotyping partner, grades 9-12.

PRESCRIPTION

Prescribe an individualized exercising regimen (for one-half of the period) based on the objective and subjective appraisal. (Suggested exercises and tasks have been grouped below according to specific physical fitness factors.[1]) Devote the remainder of the period to tasks, activities and games based on individual, or group interests.

Student learning experience: recording those tasks, activities and games that you enjoy on your prescription card, grades 9-12.

Strength Development

A. **Explosive strength and agility (strength plus speed)**
   1. Arms
      a. Medicine ball throw
      b. Softball throw
      c. Shot-put
      d. Weight training arm exercises involving rapidity of movement

Fig. 4-6 Military Press

[1]Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child*, © 1973, pp. 158-161.

   2. Legs
      a. Shuttle run
      b. Standing broad jump across gym
      c. Repeated vertical wall jump
      d. Hopping on one and both feet across the gym
      e. Weight training leg exercises involving rapidity of movement

B. **Abdominal strength**
   1. Curl-ups (hands on thighs; just raise head and shoulders)
   2. Curl-ups: touch finger tips to knee caps
   3. Sit-ups (hands behind head): knees flexed, have partner hold feet

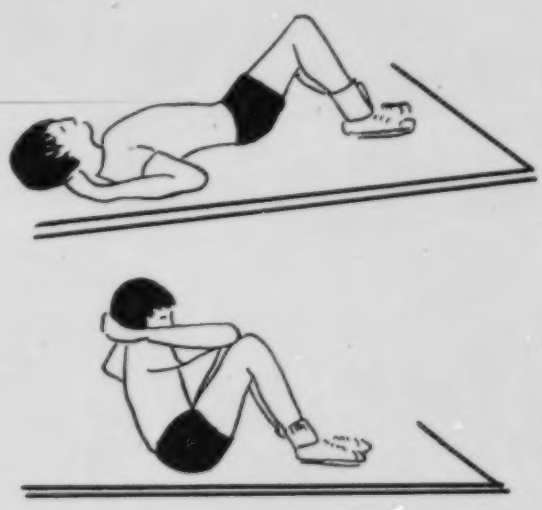


Fig. 4-7 Sit-ups, Knees Flexed

   4. Modified leg lifts (supine position): bring knees to chest and return to original position
   5. Same as number 4 except follow knees to chest with legs straight overhead
   6. Sit-ups (hands behind head and knees flexed): without partner
   7. Same as number 6 on an inclined board
   8. Same as number 6 with added weight behind the neck
   9. "Vee sit-ups" (supine position on mat): with arms extended overhead, simultaneously raise arms and legs, touching fingertips to toes

C. **Grip strength (grip, wrist, forearm)**
   1. Squeeze rubber ball
   2. Crumple sheet of paper laid flat on a table
   3. Curl dumbell with alternate hands
   4. Rope curl: roll rope with suspended weight around stick held in two hands
   5. "French curls": curl barbell with palms facing the floor

D. **Arm Strength**

1. Biceps
   a. Curl dumbells
   b. Curl barbell
   c. Curl barbell with increasing weights
   d. Modified pull-ups: palms facing body
   e. Pull-ups: palms facing away from body
   f. Rope climbing: arms and legs
   g. Rope climb: arms only
   h. Pull-over: horizontal bar
   i. Static hang: chinning bar
   j. Half-inverted hang: rings
   k. Skin-the-cat: rings
   l. Leg cuts: rings
2. **Triceps**
   a. Press dumbells
   b. Press barbell
   c. Press barbell with weights
   d. Modified push-ups on knees
   e. Push-ups: legs straight
   f. Hand walk: parallel bars
   g. Hand hopping: parallel bars
   h. Bench presses
   i. Swinging and swinging dips on parallel bars
   j. Leg cuts: side horse

E. **Back strength**

1. Back extension on floor: from prone position.
2. Same as number 1 but raise legs also
3. Wrestler's bridge: supine on floor, arch back and support all weight on hands and feet
4. Back extension with head and shoulders and waist over edge of table: hands behind neck, touch elbows to the floor and raise up to horizontal position

F. **Leg strength**

1. Heel raises: raise arms and rise up on toes, hold
2. Same as number 1 with added weight
3. Bench exerciser
4. Squats
5. Squats with weights
6. Leg presses (power rack)
7. Harvard Step Test
8. Harvard Step Test with weights

Cardiorespiratory Endurance (Stamina)

1. "Spot running": running in place
2. Running measured distance: time constant
3. Running measured distance: reduce the time
4. Jumping jacks and other gross motor activities: constantly increase repetitions
5. Same as number 4 but keep repetitions constant while reducing the time
6. Rope skipping: repetitions and time constant
7. Same as number 6 but keep "reps" constant and reduce the time
8. Harvard Step Test: start with 30-four-count steps for two minutes; increase the time by thirty seconds until student can perform for five minutes.

EVALUATION

Readminister the Township of Ocean Physical Fitness Test and Form B of Self-Concept Scale and Wear Attitude Inventory (nine-week intervals). Record student achievement on the Behavioral Performance Chart in Appendix 13 (to be recorded as follows: physical fitness—pre- and post-test; PFI scores and criterion-referenced norms—pass or fail.)

If a student achieves a PFI score of 50, with no single component stanine score of less than 4, or a score that is consistent with his somatotype, he is to be released from the D&A Program. If minimal standards are not achieved, continue prescriptive program for another nine-week period. A post-test score that is lower than the initial test score may be indicative of a medical problem; in those situations, it is recommended that the student be referred to the family, or school physician for a thorough medical examination.

STUDENT LEARNING EXPERIENCES

1. *Perform and Administer the Township of Ocean School District Physical Fitness Test Battery: Record Raw Scores, Grades 4-8.*

   Teacher's Role. a. Explain and demonstrate the correct techniques for performing the arm hang, sit-ups, standing broad jump, and the endurance events. b. Administer the 200 yard dash for students below twelve years of age. c. Pair the students and distribute the forms and pencils for recording the test scores. d. Assist and guide individuals during performance.

   Student's Role. a. Perform each test item and record his own raw scores. b. Observe the performance of his partner, provide feedback regarding correct or incorrect performance, and keep count of achievement.
2. *Determine Percentile, Achievement and PFI Scores, Grades 9-12.*

   Teacher's Role. a. Post percentile norms and a sample form reflecting conversion of raw data to percentiles, achievement indexes and PFI scores. b. Explain procedures for converting raw data to percentiles, achievement index and PFI scores. c. Explain how one interpolates a raw score located between two percentiles. (Refer to example on page 96.) d. Distribute test forms and pencils to the students. e. Assist and guide students.

   Student's Role. a. Determine his own percentiles (interpolate where necessary), achievement indexes, and PFI scores. b. Check the scores of his partner for accuracy.

Example of Score Interpolation

To Calculate the Percentile of a Given Score
Score=fifty-three sit-ups, 11 year old girl

Percentiles Given		Raw Scores
65	58	
5 x	53	7
60	51	

Calculation

or

$x \div 5 = 2 \div 7$ $\qquad \frac{x}{5} = \frac{2}{7}$

$7x = 10$ $\qquad 7x = 10$

$x - 1\ 3/7 = 1.43$ $\qquad x = 1\ 3/7 = 1.43$

$60 + 1.43 = 61.43$ $\qquad 60 + 1.43 = 61.43$

Answer: The percentile for fifty-three sit-ups would be 61; always drop the decimal if it is less than .50; increase the percentile by one if decimal is .50 or higher.

3. *Plot Achievement Scores on Profile Sheet, Grades 4-12.*

   Teacher's Role. a. Post sample profile sheet. b. Explain procedure for plotting achievement indexes. c. Distribute profile sheets and pencils. d. Assist and guide students.

   Student's Role. a. Plot personal achievement scores. b. Check the scores of his partner.

4. *Plan Prescriptive Program, Grades 9-12.*

   Teacher's Role. a. Explain the basis for prescription: achievement index of 2 or below—four exercises; index of 3 or 4—three exercises; index of 5 or 6—two exercises; and index of 7 or above—one exercise. b. Assist and guide students in writing prescriptions and selecting exercises.

   Student's Role. a. Note his relative strengths and weaknesses. b. Record the number of exercises he must perform for each fitness factor. c. Select his exercises. (Check with the teacher regarding his prescription.)

5. *Somatotype Your Partner, Grades 9-12.*

   Teacher's Role. a. Explain somatotyping procedure (identifying primary and secondary components) and rationale for somatotyping students (establish realistic goals). b. Post somatotyping descriptive material. c. Assist students in identifying the basic components of body structure.

   Student's Role. a. Identify his partner's primary and secondary somatotyping components. (The partner is to identify his own components at the same time.) Compare assessments. b. Reverse the assessment procedure. Compare assessments. c. Select activities that are appropriate for his body structure and add to his prescription list (Chapter Seven).

6. *Prepare a list of Activities and Games You Enjoy, Grades 4-12.*

   Teacher's Role. a. Assist and guide students in the selection of educationally sound activities.

   Student's Role. a. Add activities and games to his prescription list that he would like to participate in during the second half of each period. The first half of each Developmental and Adapted class is devoted to activities based on individual deficiencies.

7. *Implement Prescriptive Program, Grades 4-12.*

   Teacher's Role. a. Stimulate students to analyze the body movements and the values derived by such questions as, "What muscle(s) is or are involved when the arm flexes or extends?" b. Assist and guide students in structuring exercises and games so that they always achieve success. c. Explain how to implement the "overload" concept.

   Student's Role. a. Perform all prescribed exercises for a 15-20 minute time period (utilizing the "overload" principle). b. Perform activities and games based on his somatotype and interest during the last half of the period.

TABLE 4-6

Township of Ocean School District

PHYSICAL FITNESS INDEX CONVERSION CHART 1/75

AGE 6

RAW SCORES ARM HANG		RAW SCORES SIT-UPS		RAW SCORES BROAD JUMP		RAW SCORES 200 YD. DASH		PERCENTILE	STANINE
Number of Pupils Tested – 143									
M	F	M	F	M	F	M	F		
68	31	60	72	60	54	38	40	99	9
39	22	36	40	54	49	39	41	96	8
27	16	30	31	50	47	40	43	90	8
21	13	28	25	48	45	42	45	80	7
20	12	26	23	46	44	43	46	75	6
17	11	24	23	44	43	44	47	70	6
15	10	21	22	42	41	44	48	65	6
15	10	20	20	42	40	45	48	60	5
13	9	15	17	40	39	47	49	50	5
11	6	13	13	38	38	49	50	40	5
10	6	12	13	37	37	50	51	35	5
8	6	10	12	36	37	51	53	30	4
7	5	9	11	34	36	52	54	25	4
6	5	8	10	32	35	53	55	20	4
4	3	3	6	24	31	58	59	10	3
2	1	2	3	9	27	65	66	4	2
0	0	0	0	0	0	66	67	1	1

AGE 7

60	58	100	100	59	57	35	36	99	9
42	32	50	40	55	51	37	38	96	8
31	25	40	33	51	48	39	40	90	8
24	15	30	25	48	46	40	43	80	7
21	14	26	23	48	45	41	44	75	6
19	13	24	21	48	44	42	44	70	6
17	11	21	20	47	43	43	44	65	6
15	10	20	20	46	42	43	45	60	5
13	8	18	17	44	41	44	46	50	5
11	7	15	15	42	40	45	47	40	5
11	6	14	14	42	39	46	48	35	5
10	5	13	13	40	38	47	49	30	4
9	5	12	12	40	38	47	50	25	4
8	5	10	11	39	37	48	51	20	4
6	4	8	7	36	35	52	53	10	3
5	2	5	4	34	33	55	56	4	2
0	0	0	0	0	0	56	57	1	1

COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI
4	10	12	30	20	50	28	70
5	13	13	33	21	53	29	73
6	15	14	35	22	55	30	75
7	18	15	38	23	58	31	78
8	20	16	40	24	60	32	80
9	23	17	43	25	63	33	83
10	25	18	45	26	65	34	85
11	28	19	48	27	68	35	88
						36	90

TABLE 4-6 (Continued)

Township of Ocean School District

PHYSICAL FITNESS INDEX CONVERSION CHART 1/75

AGE 8

RAW SCORES ARM HANG		RAW SCORES SIT-UPS		RAW SCORES BROAD JUMP		RAW SCORES 200 YD. DASH		PERCENTILE	STANINE
Number of Pupils Tested – 143									
M	F	M	F	M	F	M	F		
53	50	100	120	68	60	33	35	99	9
45	31	92	100	63	57	35	37	96	8
35	23	50	71	59	53	36	38	90	8
28	17	38	52	56	50	37	40	80	7
24	17	32	49	55	49	38	40	75	6
23	15	30	40	53	48	38	41	70	6
20	14	28	35	53	47	39	41	65	6
19	13	26	30	51	47	39	42	60	5
16	11	24	25	49	44	40	43	50	5
14	9	21	21	47	43	42	45	40	5
12	8	20	20	46	42	43	45	35	5
11	7	20	20	46	41	43	46	30	4
9	6	17	19	44	39	44	47	25	4
7	5	16	17	43	38	45	48	20	4
5	4	12	11	40	36	47	51	10	3
1	2	9	6	35	34	49	55	4	2
0	0	0	0	0	0	50	56	1	1

AGE 9

75	70	121	100	71	66	31	32	99	9
65	43	100	100	69	63	32	33	96	8
52	33	70	62	64	58	34	35	90	8
37	24	55	50	59	54	35	38	80	7
32	21	50	50	57	53	36	38	75	6
30	18	50	43	55	51	36	39	70	6
27	17	42	40	54	50	37	39	65	6
24	15	41	38	54	49	38	40	60	5
19	12	35	32	52	47	40	41	50	5
15	10	30	29	49	45	40	42	40	5
13	9	26	25	48	44	41	43	35	5
11	8	24	24	48	44	42	43	30	4
10	6	22	23	47	43	43	44	25	4
8	5	21	22	45	41	44	45	20	4
5	4	16	18	43	38	46	47	10	3
2	2	10	7	37	35	50	49	4	2
0	0	0	0	0	0	51	50	1	1

COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI
4	10	12	30	20	50	28	70
5	13	13	33	21	53	29	73
6	15	14	35	22	55	30	75
7	18	15	38	23	58	31	79
8	20	16	40	24	60	32	80
9	23	17	43	25	63	33	83
10	25	18	45	26	65	34	85
11	28	19	48	27	68	35	88
						36	90

TABLE 4-6 (Continued)

Township of Ocean School District

PHYSICAL FITNESS INDEX CONVERSION CHART 1/75

AGE 10

RAW SCORES ARM HANG		RAW SCORES SIT-UPS		RAW SCORES BROAD JUMP		RAW SCORES 200 YD. DASH		PERCENTILE	STANINE
Number of Pupils Tested – 143									
M	F	M	F	M	F	M	F		
80	63	125	121	70	67	30	30	99	9
69	50	100	100	65	64	32	32	96	8
57	40	89	85	63	61	33	33	90	8
41	25	55	63	60	56	34	35	80	7
37	23	52	57	59	56	35	36	75	6
32	20	50	50	58	55	35	36	70	6
29	17	50	45	57	54	36	37	65	6
25	15	45	42	55	53	36	37	60	5
20	12	38	40	53	51	37	38	50	5
16	10	32	32	51	49	38	39	40	5
14	10	30	30	50	49	38	39	35	5
13	9	28	27	49	48	39	40	30	4
10	7	24	25	48	47	40	41	25	4
8	6	21	23	48	44	41	42	20	4
5	4	18	20	44	41	44	44	10	3
1	2	13	15	41	37	47	50	4	2
0	0	0	0	0	0	48	51	1	1

AGE 11

90	83	125	125	76	74	30	30	99	9
83	58	125	125	74	72	31	33	96	8
64	38	90	100	70	70	32	34	90	8
45	31	70	63	67	67	33	36	80	7
42	26	68	68	65	64	34	36	75	6
39	24	64	60	64	63	34	37	70	6
35	21	60	58	64	62	35	37	65	6
33	19	54	51	63	61	35	38	60	5
27	15	50	50	62	60	36	39	50	5
22	13	47	40	60	58	37	39	40	5
20	12	43	36	58	57	38	40	35	5
18	10	37	35	58	55	38	41	30	4
14	8	32	30	55	54	39	42	25	4
12	7	30	30	52	52	40	43	20	4
8	4	25	22	50	48	41	45	10	3
2	2	21	17	42	46	44	49	4	2
0	0	0	0	0	0	47	51	1	1

COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI
4	10	12	30	20	50	28	70
5	13	13	33	21	53	29	73
6	15	14	35	22	55	30	75
7	18	15	38	23	58	31	79
8	20	16	40	24	60	32	80
9	23	17	43	25	63	33	83
10	25	18	45	26	65	34	85
11	28	19	48	27	68	35	88
						36	90

TABLE 4-6 (Continued)
Township of Ocean School District

PHYSICAL FITNESS INDEX CONVERSION CHART 1/75

AGE 12

RAW SCORES ARM HANG		RAW SCORES SIT-UPS		RAW SCORES BROAD JUMP		RAW SCORES 8-MINUTE RUN[1]		PERCENTILE	STANINE
Number of Pupils Tested – 143									
M	F	M	F	M	F	M	F		
86	65	125	117	80	82	5.0	4.1	99	9
74	60	125	100	76	75	4.7	4.0	96	8
62	45	122	80	73	72	4.4	3.6	90	8
45	34	101	69	72	69	4.3	3.4	80	7
42	31	90	64	70	68	4.2	3.3	75	6
39	31	75	60	69	67	4.1	3.3	70	6
35	25	68	55	67	67	4.0	3.2	65	6
32	23	65	52	66	66	4.0	3.2	60	5
28	18	60	50	64	63	3.7	3.1	50	5
23	14	55	45	62	62	3.5	3.0	40	5
20	13	51	43	61	60	3.4	3.0	35	5
19	12	43	40	60	59	3.4	2.6	30	4
17	10	40	40	60	58	3.2	2.6	25	4
16	9	35	35	58	56	3.1	2.4	20	4
8	5	27	28	52	51	3.0	2.3	10	3
5	4	20	22	48	47	2.7	2.2	4	2
0	0	0	0	0	0	2.4	2.1	1	1

AGE 13

94	65	125	105	89	78	5.6	4.1	99	9
79	60	125	100	83	77	5.0	3.6	96	8
64	40	125	80	78	73	4.7	3.5	90	8
51	33	100	60	73	71	4.4	3.4	80	7
45	29	100	59	72	70	4.4	3.3	75	6
43	28	87	52	72	69	4.3	3.2	70	6
39	26	77	50	72	68	4.2	3.1	65	6
37	23	72	50	71	68	4.2	3.1	60	5
30	20	50	45	69	65	4.1	3.0	50	5
24	15	50	40	65	62	4.0	2.7	40	5
21	13	49	37	65	61	3.7	2.7	35	5
20	12	45	35	63	60	3.6	2.6	30	4
17	10	40	32	62	60	3.5	2.5	25	4
13	10	38	30	60	58	3.4	2.4	20	4
9	5	31	25	58	56	3.3	2.4	10	3
6	4	25	20	51	51	3.0	2.1	4	2
0	0	0	0	0	0	2.4	1.7	1	1

COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI
4	10	12	30	20	50	28	70
5	13	13	33	21	53	29	73
6	15	14	35	22	55	30	75
7	18	15	38	23	58	31	79
8	20	16	40	24	60	32	80
9	23	17	43	25	63	33	83
10	25	18	45	26	65	34	85
11	28	19	48	27	68	35	88
						36	90

[1]NOTE: Measured in laps (440 yards) and 1/8's of a lap. (Thus, 4.0 reflects four complete laps; 3.7 reflects three complete laps, plus 7/8's of a lap.)

TABLE 4-6 (Continued)
Township of Ocean School District

PHYSICAL FITNESS INDEX CONVERSION CHART 1/75

AGE 14

RAW SCORES ARM HANG		RAW SCORES SIT-UPS		RAW SCORES BROAD JUMP		RAW SCORES 12-MINUTE RUN[1]		PERCENTILE	STANINE
Numbers of Pupils Tested – 163									
M	F	M	F	M	F	M	F		
103	75	125	100	96	84	8.1	6.3	99	9
82	57	120	70	94	80	7.5	5.6	96	8
75	45	101	55	84	75	7.3	5.3	90	8
65	34	100	49	81	72	6.7	4.7	80	7
62	32	100	45	80	71	6.6	4.6	75	6
55	29	86	42	78	70	6.4	4.6	70	6
49	24	85	40	76	68	6.4	4.3	65	6
48	22	79	35	75	67	6.3	4.2	60	5
44	19	66	31	73	66	6.0	4.0	50	5
38	15	60	26	72	64	5.7	3.7	40	5
36	15	60	25	71	63	5.5	3.7	35	5
34	13	55	23	69	62	5.4	3.5	30	4
27	11	50	21	67	60	5.3	3.3	25	4
24	8	50	20	65	59	5.2	3.0	20	4
15	5	35	15	61	55	4.6	2.7	10	3
8	1	26	12	58	51	3.7	2.0	4	2
0	0	0	0	0	0	3.4	1.9	1	1
AGE 15									
Number of Pupils Tested – 209									
126	70	125	90	100	89	8.5	8.1	99	9
105	58	121	71	96	80	7.4	6.0	96	8
86	37	110	57	91	77	6.7	5.6	90	8
73	30	101	50	87	72	6.4	5.1	80	7
68	28	100	45	86	71	6.3	5.0	75	6
65	25	100	42	84	70	6.2	4.7	70	6
61	24	100	40	84	69	6.0	4.7	65	6
60	22	100	40	83	68	5.7	4.7	60	5
54	18	80	35	80	66	5.7	4.5	50	5
48	15	70	30	78	64	5.4	4.3	40	5
46	13	65	30	77	63	5.3	4.2	35	5
43	12	60	30	76	62	5.2	4.1	30	4
38	10	55	28	75	60	5.1	4.1	25	4
34	8	54	26	73	59	4.7	4.0	20	4
22	5	45	20	70	54	4.3	3.6	10	3
15	4	32	12	66	52	3.6	3.1	4	2
0	0	0	0	0	0	3.1	2.1	1	1

COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI
4	10	12	30	20	50	28	70
5	13	13	33	21	53	29	73
6	15	14	35	22	55	30	75
7	18	15	38	23	58	31	79
8	20	16	40	24	60	32	80
9	23	17	43	25	63	33	83
10	25	18	45	26	65	34	85
11	28	19	48	27	68	35	88
						36	90

[1]NOTE: Measured in laps (440 yards) and 1/8's of a lap. (Thus, 4.0 reflects four complete laps; 3.7 reflects three complete laps, plus 7/8's of a lap.)

TABLE 4-6 (Continued)
Township of Ocean School District

PHYSICAL FITNESS INDEX CONVERSION CHART

1/75

AGE 16

RAW SCORES ARM HANG		RAW SCORES SIT-UPS		RAW SCORES BROAD JUMP		RAW SCORES 12-MINUTE RUN[1]		PERCENTILE	STANINE
Number of Pupils Tested – 163									
M	F	M	F	M	F	M	F		
121	75	120	81	105	84	8.0	6.4	99	9
109	51	115	70	99	77	7.3	5.5	96	8
85	37	101	51	94	74	7.0	5.3	90	8
78	30	100	50	90	70	6.6	5.0	80	7
74	26	95	45	88	69	6.4	4.7	75	6
70	22	80	40	86	67	6.2	4.7	70	6
68	20	75	40	86	66	6.1	4.5	65	6
65	19	75	40	84	65	6.0	4.4	60	5
58	16	60	36	83	63	5.7	4.3	50	5
50	12	55	33	80	61	4.6	4.2	40	5
48	11	50	30	80	60	5.5	4.1	35	5
42	10	50	30	77	59	5.3	4.0	30	4
40	9	45	29	75	57	5.2	4.0	25	4
38	8	40	25	74	57	4.6	3.7	20	4
28	5	33	23	71	52	4.2	3.5	10	3
19	1	25	20	65	48	3.6	2.5	4	2
0	0	0	0	0	0	3.0	1.3	1	1
AGE 17									
Number of Pupils Tested – 181									
120	61	125	80	106	88	8.2	6.4	99	9
112	42	115	60	101	78	7.7	5.4	96	8
87	27	102	50	96	75	7.3	5.2	90	8
79	22	100	50	93	75	6.7	4.6	80	7
75	19	95	47	92	72	6.7	4.6	75	6
71	18	90	45	90	71	6.5	4.3	70	6
68	16	81	41	90	70	6.3	4.3	65	6
64	15	76	40	89	69	6.3	4.3	60	5
60	14	70	35	87	67	6.0	4.1	50	5
54	12	65	30	84	66	5.7	4.0	40	5
48	11	60	30	84	65	5.6	4.0	35	5
45	10	52	30	82	63	5.4	3.7	30	4
41	10	51	30	81	63	5.1	3.7	25	4
40	8	50	25	79	60	4.7	3.7	20	4
31	5	40	20	75	55	4.6	3.4	10	3
25	3	25	12	70	48	3.5	3.2	4	2
0	0	0	0	0	0	3.0	2.4	1	1

COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI	COMPOSITE STANINES	PFI
4	10	12	30	20	50	28	70
5	13	13	33	21	53	29	73
6	15	14	35	22	55	30	75
7	18	15	38	23	58	31	79
8	20	16	40	24	60	32	80
9	23	17	43	25	63	33	83
10	25	18	45	26	65	34	85
11	28	19	48	27	68	35	88
						36	90

[1]NOTE: Measured in laps (440 yards) and 1/8's of a lap. (Thus, 4.0 reflects four complete laps; 3.7 reflects three complete laps, plus 7/8's of a lap.)

CHAPTER FIVE

DEVELOPMENTAL PROGRAM

LOW MOTOR ABILITY

DEFINITION

Low Motor Ability is defined as a deficiency in gross body coordination, gross body balance, eye and hand coordination, eye and hand accuracy, or a composite deficiency thereof. Students with a Motor Ability Index (MAI) of thirty-five or below (approximately the bottom ten percent of the population tested) or a single achievement score of two or below (approximately the bottom five percent of the population tested) are to be classified as manifesting *Low Motor Ability*.

This test is only valid for children in grades K-2, or children with severe motoric problems. When used with normal students above grade 2, most students will be able to perform most items with relative ease.[1]

BEHAVIORAL OBJECTIVES

1. The student attains a minimum average standard score of 50 on the Township of Ocean Motor Ability Test Battery (with no single component stanine score of less than 4), or a score that is satisfactory in terms of his somatotype (grades K-2, or children with mental retardation or learning disabilities regardless of grade level). Student performance is assessed by the teacher.
2. The student performs his prescribed motor tasks correctly (grades K-2, or children with mental retardation or learning disabilities regardless of grade level. Student performance is assessed by the teacher.
3. The student demonstrates an increasingly positive self-concept as evidenced by pre- and post-test scores on the Self-Concept Pictorial Scale [1] (grades K-2).
   Evaluative criteria: ten percent gain in raw score. (Student performance is assessed by the teacher.)

TEST

Administration procedures for motor ability test.

The motor ability test presented is a modified version of the battery developed as a result of the Temple University-Buttonwood Farms Project.[2]

Test directions

The tester should observe student performance carefully and record anecdotal remarks for all failures so that an individualized program can be prescribed.

Gross Body Coordination

Test Item No. 1: *Walk*

Factor: Gross Body Coordination

Subject must walk at least fifteen feet in a smooth manner. Bilateral coordination of opposite arm and leg is required, i.e., left arm—right foot and right arm—left foot, plus subjective evaluation of gross body coordination.

Attempts: 2 Scoring: Maximum—2 points

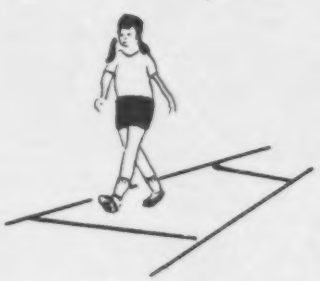


Fig. 5-1 Walk

[1] The Township of Ocean School District is currently developing a motor ability test battery to diagnose the needs of children in grades 3-6.

[1] Angelo S. Bolea, Donald W. Felker and Margaret D. Barnes, "A Pictorial Self-Concept Scale for Children in K-4," *Journal of Educational Measurement*, pp. 223-224.

[2] Donald Hilsendager, Harold K. Jack and Lester Mann, *Basic Motor Fitness Test for Emotionally Disturbed Children*, pp. 7-11.

Test Item No. 2: *Creep*
Factor: Gross Body Coordination

Bilateral coordination of opposite hand and knee is required, i.e., left hand–right knee must come forward at the same time and right hand–left knee must come forward at the same time. Subject must creep (hands and knees) at least ten feet (5 x 10 mat) to pass.
Attempts: 2 Scoring: Maximum–2 points

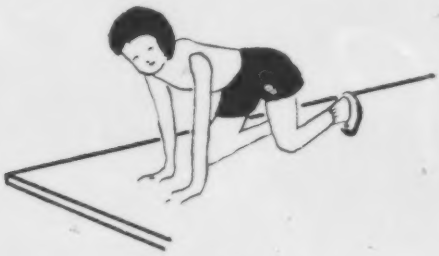


Fig. 5-2 Creep

Test Item No. 3: *Climb-stairs*
Factor: Gross Body Coordination

Subject must climb at least four consecutive steps (twelve inches high) by using alternate footwork. Both feet must not come together on a step, but rather one foot on one step and the next step with the other foot; no support may be given. (Corridor stairs may be used.)
Attempts: 2 Scoring: Maximum–2 points

Fig. 5-3 Climb Stairs

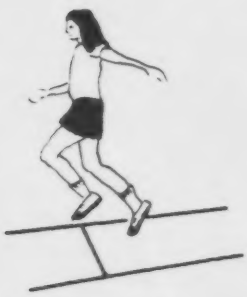


Fig. 5-4 Skip

Test Item No. 4: *Skip*
Factor: Gross Body Coordination

Subject must skip at least ten feet in a smooth manner (without extra hops). One practice attempt shall be permitted.
Attempts: 2 Scoring: Maximum–2 points

Test Item No. 5: *March-in-place*
Factor: Gross Body Coordination

To pass, the subject must keep in cadence with the tester who claps cadence of one clap per second (15 seconds) for the first attempt and two claps per second (15 seconds) for the second attempt.
Attempts: 2 Scoring: Maximum–2 points

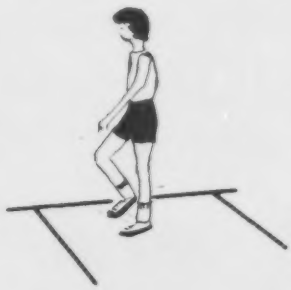


Fig. 5-5 March-In–Place

Subject's score on gross body coordination is the number of successful accomplishments in ten attempts. All of the gross body coordination skills should evidence total body coordination for a passing attempt.
Maximum total points–Gross Body Coordination–10 points

BALANCE AND POSTURAL ORIENTATION

Test Item No. 1: *Stand–both feet*
Factor: Balance and Postural Orientation

Subject must stand with feet together, arms extended forward from shoulders at a 90 degree angle and eyes closed for fifteen seconds. An unsuccessful attempt is recorded if the subject shifts his feet, or moves arms 15 degrees from the 90 degree position.
Attempts: 3 Scoring: Maximum–3 points

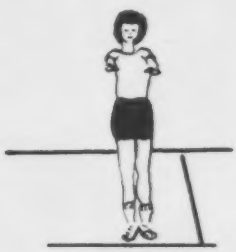


Fig. 5-6 Stand–Both Feet

Test Item No. 2: *Stand right foot*
Factor: Balance and Postural Orientation

Subject must stand on right foot with left foot off the floor and not touch any stable object for fifteen seconds (eyes open). Unsuccessful attempt if subject shifts right foot or touches left foot to right leg, foot, floor, or any other supporting structure before the elapse of fifteen seconds.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-7 Stand—Right Foot

Test Item No. 3: *Stand—left foot*
Factor: Balance and Postural Orientation

Same directions as for test item number 2 except feet are reversed.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-8 Stand—Left Foot

Test Item No. 4: *Jump—one foot leading*
Factor: Balance and Postural Orientation

Subject must jump off eighteen-inch high step or bench with one foot in front of the other. No support is allowed and balance must be maintained on landing (no shift of feet). The tester should have the subject jump and land in an area immediately adjacent to the bench.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-9 Jump—One Foot Leading

Test Item No. 5: *Jump—both feet simultaneously*
Factor: Balance and Postural Orientation

Same procedure as test item number 4 except feet are side by side.

Attempts: 3 Scoring: Maximum—3 points

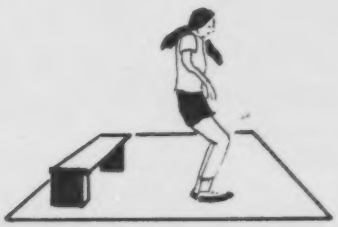


Fig. 5-10 Jump—Both Feet Simultaneously

Test Item No. 6: *Stationary jump—both feet*
Factor: Balance and Postural Orientation

Subject must jump on both feet for at least three jumps without stopping, losing balance, using a support, or stepping on, or out of an 18" square.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-11 Stationary Jump—Both Feet

Test Item No. 7: *Stationary hop left foot*
Factor: Balance and Postural Orientation

Subject must hop on left foot for at least three hops without stopping, losing balance, using a support, or stepping on, or out of an 18" square.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-12 Stationary Hop—Left Foot

Test Item No. 8: *Stationary hop—right foot*
Factor: Balance and Postural Orientation

Same procedure as test item number 7 except the subject hops on right foot.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-13 Stationary Hop—Right Foot

Subject's composite score on Balance and Postural Orientation is the number of successful accomplishments in twenty-four attempts.

Maximum total points—Balance and Postural Orientation—24 points

EYE AND HAND COORDINATION

Test Item No. 1: *Catch*
Factor: Eye and Hand Coordination

To pass, the subject must catch a whiffleball (the circumference of a softball) using only his hands. Juggling the ball, having it strike any part of the body, other than the hands, or dropping the ball, constitutes a failure. The toss must be from a distance of eight feet and thrown in a soft, underhand manner. The trajectory should be such that it does not rise higher than the subject's head and reaches the receiver at chest level.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-14 Catch

Test Item No. 2: *Ball bounce and catch*
Factor: Eye and Hand Coordination

The student must drop or push an eight inch diameter utility ball to the ground and catch it on the rebound immediately, no intervening bounces are permitted. Juggling the ball, having it strike any part of the body (other than the hands), or a drop, constitutes a failure.

Attempts: 3 Scoring: Maximum—3 points

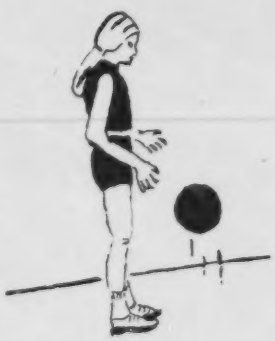


Fig. 5-15 Ball Bounce and Catch

Test Item No. 3: *Touch ball swinging laterally*
Factor: Eye and Hand Coordination

With dominant hand on shoulder (palm down, index finger extended and hand motionless), the subject on command "touch" must touch laterally swinging whiffleball (softball circumference) with the index finger on the side of the ball. The instructor holds the whiffleball suspended on an 18" cord at mid-chest level and proceeds to

swing the ball laterally. Commands are issued: (1) when the ball is at full arm extension across the midline; (2) when the ball is at the midline; and (3) when the ball is at full arm extension on the dominant side of the midline. An unsuccessful attempt is recorded if the subject delays response, touches the ball with other than the index finger, misses, or moves his head.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-16 Touch Ball Swinging Laterally

Test Item No. 4: *Touch ball swinging fore and aft*
Factor: Eye and Hand Coordination

With dominant hand on hip (palm up, index finger extended and head motionless), the subject on command "touch" must touch fore and aft swinging whiffleball (softball circumference) with index finger on the under surface of the ball. The instructor holds the whiffleball suspended on an 18" cord at midchest level and issues commands: (1) when the ball is at full arm extension; (2) when the ball is at midpoint; and (3) when the ball is closest to the subject. An unsuccessful attempt is recorded if the subject delays response, touches the ball with other than the index finger, misses, or moves his head.

Attempts: 3 Scoring: Maximum—3 points

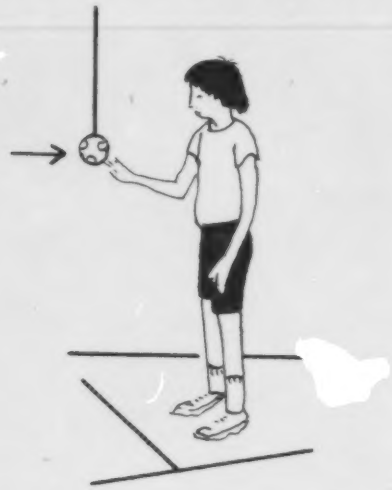


Fig. 5-17 Touch Ball Swinging Fore and Aft

Test Item No. 5: *Bat ball with hand*
Factor: Eye and Hand Coordination

Same procedure as test item number 4 except the subject bats the ball with an open hand held in readiness between the waist and shoulder. An unsuccessful attempt is recorded if some part of the hand does not touch some part of the ball.

Attempts: 3 Scoring: Maximum—3 points

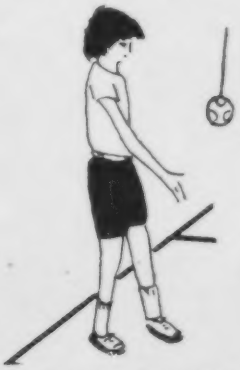


Fig. 5-18 Bat Ball With Hand

Test Item No. 6: *Bat ball with bat*
Factor: Eye and Hand Coordination

Same procedure as test item number 4 except the subject bats the ball with a plastic whiffleball bat which is held in readiness between the waist and the shoulder. An unsuccessful attempt is recorded if some part of the bat does not touch some part of the ball.

Attempts: 3 Scoring: Maximum—3 points

Fig. 5-19 Bat Ball With Bat

Maximum total points—Eye and Hand Coordination—18 points

EYE AND HAND ACCURACY

Test Item No. 1: *Throw–right hand*
Factor: Eye and Hand Accuracy

The subject throws a whiffleball (softball circumference) at a modified version of the Johnson Target Test.[1] (See illustration below). The subject may use either an overhand or underhand throwing motion; minimum throwing distance–ten feet. The ball must hit the target without previously touching the floor for a correct attempt. Scoring: 3 points, inner rectangle and line; 2 points, middle rectangle and line; 1 point, outer rectangle and line.

Attempts: 3 Scoring: Maximum–9 points

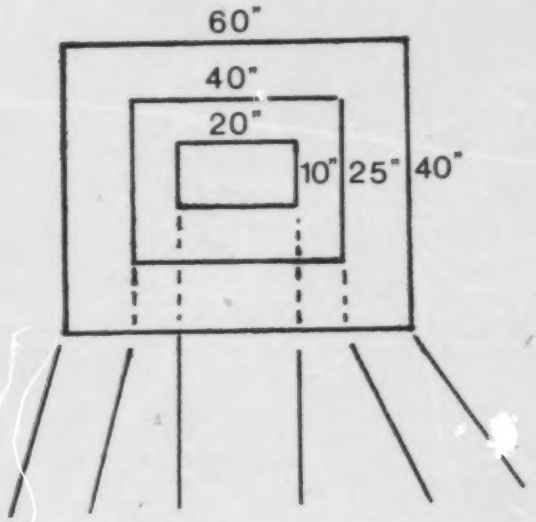


Fig. 5-20 Johnson Target Test

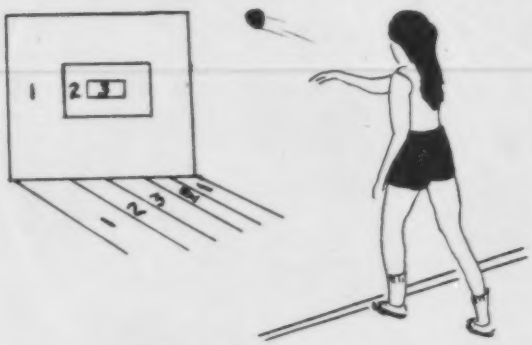


Fig. 5-21 Throw–Right Hand

Test Item No. 2: *Throw–left hand*
Factor: Eye and Hand Accuracy

Same procedure as test item number 1 except that subject throws with the left hand.

Attempts: 3 Scoring. Maximum–9 points

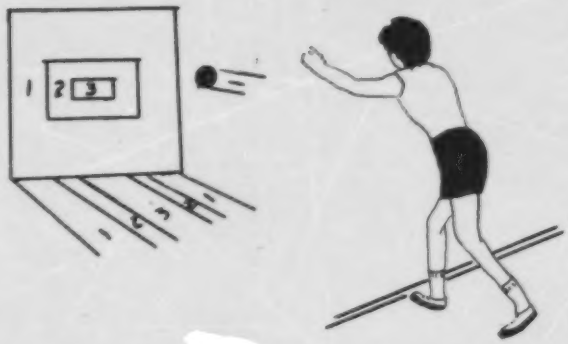


Fig. 5-22 Throw–Left Hand

Maximum total points–Eye and Hand Accuracy–18 points

EYE AND FOOT ACCURACY

Test Item No. 1: *Kick–right foot*
Factor: Eye and Foot Accuracy

Same procedure as test item number 1 above except the subject kicks stationary volleyball at the target with his right foot and the ball may touch the floor prior to contacting the target.

Attempts: 3 Scoring: Maximum–9 points

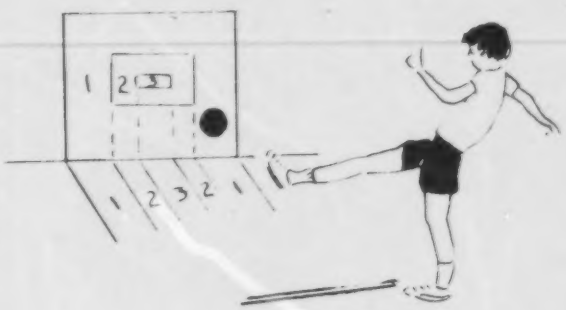


Fig. 5-23 Kick–Right Foot

Test Item No. 2: *Kick–left foot*
Factor: Eye and Foot Accuracy

Same procedure as test item number 1 except the subject kicks stationary volleyball with his left foot.

Attempts: 3 Scoring: Maximum–9 points

[1] L. William Johnson, "Objective Test in Basketball for High School Boys."

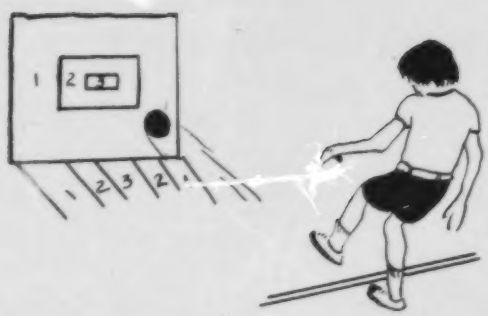


Fig. 5-24 Kick—Left Foot

Subject's composite score on eye and foot accuracy is the total number of points scored in six attempts.

Maximum total points—Eye and Foot Accuracy—18 points

Maximum Grand Total—88 points

Administration procedures for the self-concept scale

Administer Form A of the Self-Concept Pictorial Scale to students in grades 1-4. (Refer to Appendix II for Self-Concept Test materials.)

Recording form

Record raw scores on Table 5-1. Compute sub-scores for each motor skill category. Compute and enter percentiles and stanine scores (Tables of Numbers are located in Appendix 15.) Compute Motor Ability Index (MAI) score.

(**Note**: Use norms in Table 5-2 to determine percentiles until you can establish your own school norms.)

ASSESSMENT

Motor ability profile sheet

Record stanine scores on Table 5-3 on page

Motor ability time prescription chart

Convert stanine scores to time prescriptions via use of Table 5-4. (Refer to Table 5-5 on page for an example.) Total prescription time should be one-half of the activity period.

Objective appraisal

Record individual prescriptions. Also record self-concept data.

Subjective appraisal

Observe motor patterns carefully. Focus attention on the *process* as well as the *product*. In other words, pay careful attention to *how* the child performs each test item. Does he manifest a similar problem in performing a variety of tests? Some of the common problems you may note are as follows: (1) tense, restricted movements; (2) inability to "track" an object smoothly; (3) the tendency to favor one side of the body in performing tasks; and (4) ability to perform discrete skills, but unable to integrate. Record motor pattern problems based on subjective evaluation on Individual Prescription Card under "Anecdotal Remarks."

PRESCRIPTION

Prescribe an individualized motor patterning regimen (for one-half of the period) based on the objective and subjective appraisal. Devote the remainder of the period to tasks, activities and games that are based on individual or group appeal. Suggested tasks, activities and games for the common motor patterning problems are cited below for your consideration.[1]

I. COORDINATION

A. Gross Motor skills

- a. Crawling
- b. Skipping
- c. Hopping
- d. Throwing underhand
- e. Throwing overhand
- f. Jumping
- g. Pushing
- h. Pulling
- i. Lifting

B. Gross motor activities: individual, dual, and team

- a. Forward roll
- b. Log roll
- c. Backward roll
- d. Monkey roll (partners)
- e. Marching
- f. Hop scotch
- g. "Simon Says"
- h. "Jumping Jacks"
- i. Cable jump
- j. Rope-skipping
- k. Rhythmics
- l. Lay-ups
- m. Shot-putting
- n. Hurdling

Fig. 5-25 Eye and Hand Coordination

[1]Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child*, © 1973, pp. 158-160.

TABLE 5–1

MOTOR ABILITY TEST FORM

NAME _____ ____ ____ _____ ____
Last First Age Grade School Sex

HANDEDNESS: R ___ L ___ FOOTEDNESS: R ___ L ___

CLASSROOM TEACHER _____

DATE _____

WEIGHT _____

HEIGHT _____

			PRE–TEST				POST–TEST			
TEST ITEM	ATT.	FACTOR MEASURED	TRIALS	RS	%	S	TRIALS	RS	%	S
1 Walk	2	Gross Body Coord.								
2 Creep	2	Gross Body Coord.								
3 Climb stairs	2	Gross Body Coord.								
4 Skip	2	Gross Body Coord.								
5 March-in-place	2	Gross Body Coord.								
TOTAL (Maximum–10 Points)										
1 Stand–both feet (15 sec.)	3	Bal-Post. Orient.								
2 Stand–right foot (15 sec.)	3	Bal-Post. Orient.								
3 Stand–left foot (15 sec.)	3	Bal-Post. Orient.								
4 Jump–one foot leading	3	Bal-Post. Orient.								
5 Jump–both feet simultaneously	3	Bal-Post. Orient.								
6 Jump–both feet	3	Bal-Post. Orient.								
7 Hop–right foot	3	Bal-Post. Orient.								
8 Hop–left foot	3	Bal-Post. Orient.								
TOTAL (Maximum–24 Points)										
1 Catch	3	Eye-hand Coord.								
2 Ball–bounce and catch	3	Eye-hand Coord.								
3 Touch ball swg. laterally	3	Eye-hand Coord.								
4 Touch ball swg. fore/aft	3	Eye-hand Coord.								
5 Bat ball with hand	3	Eye-hand Coord.								
6 Bat ball with bat	3	Eye-hand Coord.								
TOTAL (Maximum–18 Points)										
1 Throw–right hand	3	Eye-hand Accuracy								
2 Throw–left hand	3	Eye-hand Accuracy								
TOTAL–Maximum–18 Points)										
1 Kick–right foot	3	Eye-foot Accuracy								
2 Kick–left foot	3	Eye-foot Accuracy								
TOTAL (Maximum–18 Points)										
GRAND TOTAL (Stanine Points)										

ANECDOTAL REMARKS

Symbols

RS = raw score
% = percentile score
S = Stanine score
+ = passed
0 = failed

(Source: Hilsendager, D.R., H.K. Jack and Lester Mann. *Basic Motor Fitness Test for Emotionally Disturbed and Mentally Handicapped Children: Preliminary Report.* National Institute of Mental Health. Grant Number 1-TL-MH-8543-1,5. 1968.)

TABLE 5–2

KINDERGARTEN MOTOR ABILITY TEST NORMS (Courtesy of the Township of Ocean School District)

	Gross Body Coordination	Balance Postural Orientation	Eye and Hand Coordination	Eye and Hand Accuracy	Eye and Foot Accuracy		
Number of Pupils Tested–	234	244	249	262	258		
	RAW SCORES	RAW SCORES	RAW SCORES	RAW SCORES	RAW SCORES	PERCENTILE	STANINE
	10	24	17	16	15	99	9
	10	23	17	12	9	96	8
	10	21	16	10	7	90	8
	10	20	15	9	6	80	7
	10	19	15	9	6	75	6
	10	19	14	8	6	70	6
	9	18	14	8	6	65	6
	9	17	14	8	6	60	5
	8	16	13	7	5	50	5
	8	15	12	6	5	40	5
	8	14	12	6	4	35	5
	8	14	12	5	4	30	4
	8	13	11	5	4	25	4
	7	12	10	4	4	20	4
	6	9	8	2	3	10	3
	6	6	7	1	2	4	2
	4	3	4	0	0	1	1

MOTOR ABILITY INDEX CONVERSION CHART (MAI)

COMPOSITE STANINES	MAI	COMPOSITE STANINES	MAI	COMPOSITE STANINES	MAI	COMPOSITE STANINES	MAI
5	10	15	30	25	50	35	70
6	12	16	32	26	52	36	72
7	14	17	34	27	54	37	74
8	16	18	36	28	56	38	76
9	18	19	38	29	58	39	78
10	20	20	40	30	60	40	80
11	22	21	42	31	62	41	82
12	24	22	44	32	64	42	84
13	26	23	46	33	66	43	86
14	28	24	48	34	68	44	88
						45	90

TABLE 5--3

PHYSICAL FITNESS AND MOTOR ABILITY PROGRESS PROFILE (Courtesy of the Township of Ocean School District.)

STUDENT'S NAME _____ AGE _____ CLASSIFICATION _____ SCHOOL _____
Last First

SYMBOLS

1st Test
Solid Line _____

2nd Test
Doted Line - - - - -

Standard Score

COMPONENT MEASURED

Standard Score	STATIC ARM HANG	MODIFIED SIT-UPS	STANDING BROAD JUMP	CARDIO-RESPIRATORY ENDURANCE	GROSS BODY COORDINATION	BALANCE POSTURAL ORIENTATION	EYE AND HAND COORDINATION	EYE AND HAND ACCURACY	EYE AND FOOT ACCURACY	AVERAGE STANDARD SCORE	Standard Score
EXCEL 90											90
80											80
GOOD 70											70
60											60
FAIR 50											50
40											40
POOR 30											30
20											20
INFER 10											10

ANECDOTAL REMARKS

_____
_____
_____
_____

N.Y. Posture Screening Test	_____	_____
Asthmatic (Vital Capacity)	_____	_____
Weight Control (lbs.)	_____	_____
Orthopedic (See Anecdotal Remarks)	_____	_____

TABLE 5--4

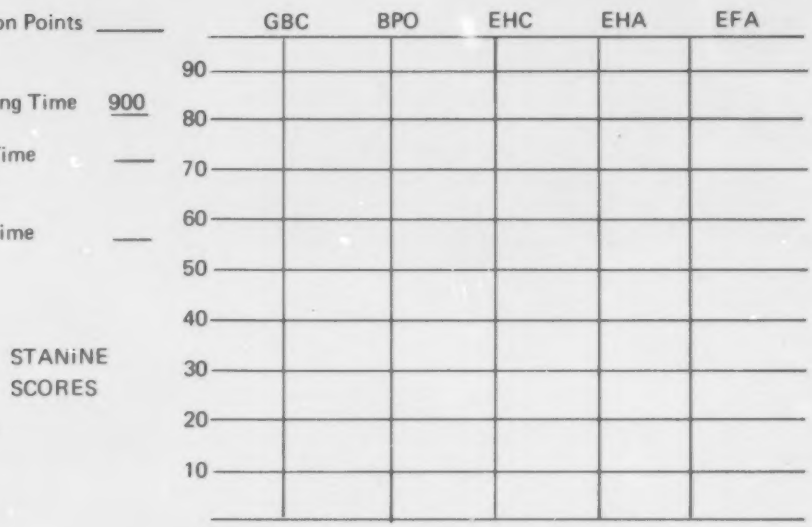
MOTOR ABILITY TIME PRESCRIPTION CHART

Total Deviation Points Below 90 _____

Total Exercising Time 900

Prescription Time Multiplier ___

Adjustment Time ___



	Gross Body Coordination	Balance and Postural Orientation	Eye and Hand Coordination	Eye and Hand Accuracy	Eye and Foot Accuracy	Total
Deviation Points Below 90						
Prescription Time Multiplier						
Sub Total						
Adjustment Time						
Total Prescription Time Per Exercise (In Seconds)*						
In Minutes and Seconds						

*To determine prescription time for each factor: (1) find prescription time multiplier by dividing total exercising time (900 seconds) by total stanine points below 90 (drop all decimals in the multiplier) (2) multiply deviation stanine points for each factor by the prescription time multiplier; (3) add adjustment time to the lowest factor; (4) total prescription time in seconds; and, (5) convert times to minutes and seconds.

(Source: Thomas M. Vodola, "The Effects of Participation Time Variations on the Development of Physical Fitness, Motor Skills and Attitudes," unpublished doctoral dissertation, Temple University, 1970, p. 150.)

TABLE 5–5

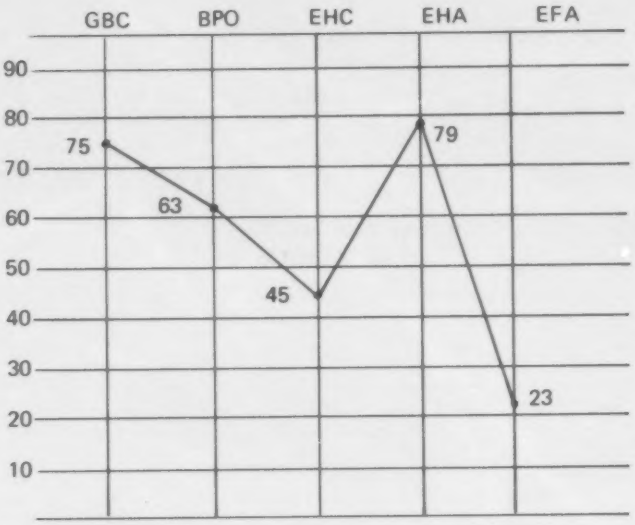
MOTOR ABILITY TIME PRESCRIPTION CHART

Total Deviation Points Below 90 — 165

Total Exercising Time — 900

Prescription Time Multiplier — 5 (165 ⌈900)

Adjustment Time — 825 / 75



	Gross Body Coordination	Balance and Postural Orientation	Eye and Hand Coordination	Eye and Hand Accuracy	Eye and Foot Accuracy	Total
Deviation Points Below 90	15	27	45	11	67	165
Prescription Time Multiplier	5	5	5	5	5	
Sub Total	75	135	225	55	335	825
Adjustment Time					75	75
Total Prescription Time Per Exercise (In Seconds)*	75	135	225	55	410	900
In Minutes and Seconds	1:15	2:15	3:45	:55	6:50	15:00

*To determine prescription time for each factor: (1) find prescription time multiplier by dividing total exercising time (900 seconds) by total stanine points below 90 (drop all decimals in the multiplier) (2) multiply deviation stanine points for each factor by the prescription time multiplier; (3) add adjustment time to the lowest factor; (4) total prescription time in seconds; and, (5) convert times to minutes and seconds.

(Source: Thomas M. Vodola, "The Effects of Participation Time Variations on the Development of Physical Fitness, Motor Skills and Attitudes," unpublished doctoral dissertation, Temple University, 1970, p. 150.)

C. Hand and eye coordination
   1. Skills
      a. Bat stationary ball with hand
      b. Bat moving ball with hand
      c. Bat stationary ball with bat
      d. Bat moving ball with bat
      e. Catch a bounced ball
      f. Catch a rolling ball
      g. Catch a thrown ball
      h. Dribble a ball.
   2. Activities: individual, dual, and team
      a. "Keep up" a balloon
      b. Catch a ball with a partner
      c. Catch a ball thrown against a wall
      d. Bat softball off "tee" into net
      e. Play quoits, shuffleboard, horseshoes
      f. Play tetherball, table tennis
      g. Play paddleball, handball
      h. Dribble basketball, volleyball, etc.
      i. Play dodgeball, newcomb
      j. Pick up "jacks"

D. Foot and eye coordination
   1. Skills
      a. Kick stationary ball
      b. Kick rolling ball
      c. Kick with instep
      d. Pass a ball (inside and outside of foot)
      e. Trap a rolling ball with the sole of foot
      f. Drop-kick a ball
      g. Punt a ball
      h. Pick up a ball with feet (stationary)
      i. Pick up a rolling ball with one foot
   2. Activities: individual, dual, and team
      a. Kick a ball with a partner or against a wall
      b. Take part in dribble races
      c. Take part in passing drills in set formation
      d. Play goal line soccer
      e. Drop-kick a ball for distance and accuracy
      f. Punt a ball for distance and accuracy
      g. Play a game of speedball
      h. Play kick-ball
      i. Run through staggered tires

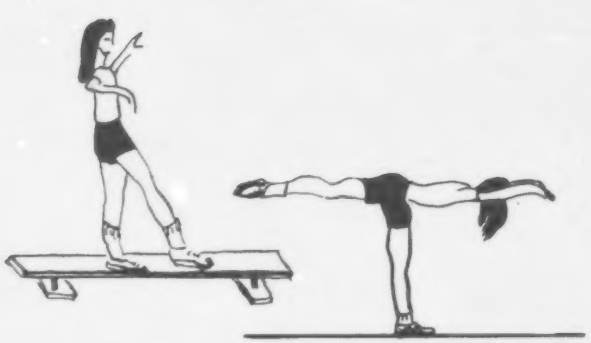


Fig. 5-26 Balance and Postural Orientation

II. BALANCE AND POSTURAL ORIENTATION

A. Skills
   1. Walk (observe cross-pattern)
   2. Walk forward, backward, sideward and toe-heel
   3. Stand on both feet, eyes open, closed
   4. Stand on right–left foot, eyes open, closed
   5. Hop on both feet
   6. Hop on one foot
   7. Hop on alternate feet
   8. Do forward roll
   9. Jump from stall bench and balance
   10. Do backward roll
   11. Balance with head and hands (tripod position)
   12. Squat with hand balance
   13. Do forearm balance
   14. Do hand balance

B. Activities: individual, dual, and team
   1. March
   2. Walk a straight, curved line, beam
   3. Take part in potato race
   4. Run in relay race
   5. Hop in and out of tires
   6. Take part in forward roll relays
   7. Take part in jump-forward roll relays
   8. Take part in backward roll relays; in combination of forward and backward roll relays
   9. See "who can maintain balance longest" (tripod position)
   10. See "who can maintain balance longest" (squat hand balance)
   11. See "who can maintain balance longest" (forearm balance)
   12. See "who can maintain balance longest" (hand balance)
   13. Take Bass Balance Test (to be explained in class)
   14. Walk forward, backward, sideward around tires; hop in and over tires

III. ACCURACY

A. Hand and eye accuracy learning experiences

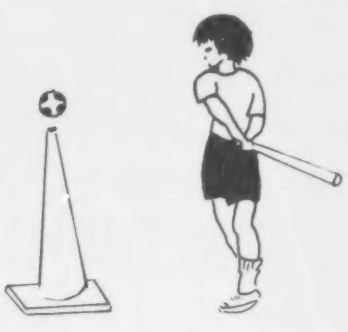


Fig. 5-27 Hand and Eye Accuracy

1. Individual and dual activities
   a. Quoits, horseshoes, shuffleboard
   b. Archery, bowling, clock golf
   c. Serve tennis and volleyball
   d. Bat softball off "tee" into net
   e. Bat softball into right, left, and center fields
   f. Throw basketball for accuracy
   g. Shoot basketball from foul line
   h. Perform basketball layups (30 seconds)

B. Foot and eye accuracy learning experiences
   1. Individual and Dual activities
      a. Kick stationary ball into net
      b. Kick rolling ball into net
      c. Drop-kick ball over target
      d. Kick up ball to teammate
      e. Kick ball to predetermined area

Fig. 5-28 Foot and Eye Accuracy

EVALUATION

Readminister the Township of Ocean Motor Ability Test and Form B of the Self-Concept Pictorial Scale (nine-week intervals). Record student achievement on Behavioral Performance Chart (Appendix 13) as follows: motor ability—pre- and post-test MAI scores; self-concept—pre- and post-test raw scores, and criterion-referenced norms—pass or fail.

If a student achieves an MAI score of 50, with no single component stanine score of less than 4, he is to be released from the D&A Program. If minimal standards are not achieved, continue prescription program for another nine-week period. Note: Attempt to discern whether the lack of improvement is attributable to poor motivation, improper prescription, or other causative factors. Possibly, motor tasks should be varied more frequently to sustain a high level of motivation.

STUDENT LEARNING EXPERIENCES

1. *Perform the Township of Ocean School District Motor Ability Test, Grades Kindergarten-2.*
   Teacher's Role. a. Explain and demonstrate the correct technique for performing each test item. b. Record raw scores (refer to Table 5-1).
   Student's Role. a. Perform test items as directed.
2. *Determine Percentile, Achievement and MAI Scores: Plot Scores on Profile Sheets; Plan Prescriptive Program, Grades Kindergarten-2.*
   Teacher's Role. a. Determine all scores. B. Plot scores on profile sheets. (Refer to Table 5-2 for Conversion Chart). c. Plan prescription programs (use the same criteria as for the physical fitness prescription).
3. *Design Tasks to Improve Gross Body Balance, Gross Body Coordination, Eye and Hand Coordination, Eye and Hand Accuracy, and Eye and Foot Accuracy, Grades 3-12.*
   Teacher's Role. a. Explain and demonstrate tasks and activities designed to improve motor performance. b. Assist and guide students in their choice.
   Student's Role. a. Devise an original task to improve each motor ability factor. b. Devise an original task to improve a motor ability factor that is appropriate for his grade level.
4. *Demonstrate a Motor Ability Skill, Grades Kindergarten-4.*
   Teacher's Role. a. Structure the situation so that each student is a "leader." b. Assist "followers" who have difficulty performing skills.
   Student's Role. a. Serve as a "leader" in the game "Follow the Leader." b. Participate as a "follower."
   Note: Games of this type reinforce the competencies of the "leaders" and provide practice in weak areas for "followers."
5. *Participate in Movement Education and Exploration, and Activities and Games, Grades Kindergarten-6.*
   Teacher's Role. a. Structure a task and then permit students the flexibility to implement creatively. b. Permit students to structure subsequent tasks and activities. c. Assist students who have difficulties with certain movement patterns.
   Student's Role. a. Implement tasks as structured. b. Serve as a "leader" in structuring new tasks.
6. *Assess Your Motor Performance in Game Situations, Grades 9-12.*
   Teacher's Role. a. Provide a variety of individual or group activity games. b. Note student deficiencies and assist on an individual basis. c. Assist students with their personal analysis.
   Student's Role. a. Keep a record of game infractions and violations (such as "traveling" and repeated fouling in basketball). b. Analyze possible cause(s) of infractions and violations. For example, repeated "traveling" and fouling may be attributable to poor body balance. c. Make a list of his areas of weakness (based on analysis).
7. *Participate in Tasks, Activities Designed to Improve Specific Deficiencies, Grades 9-12.*
   Teacher's Role. a. Provide a variety of tasks and activities designed to improve specific motor deficiencies. b. Guide and assist the student in his selection.
   Student's Role. a. Select tasks and activities to improve his areas of weakness. b. Participate in the tasks and activities; keep a record of progress.

CHAPTER SIX

POSTURAL ABNORMALITIES

DEFINITION

A postural abnormality is defined as an imbalance in muscle tone of the body which results in inefficient and ineffective body mechanics. Students with a composite screening score of seventy or below, or a single item score of one on the modified New York Posture Screening Test are referred to the medical inspector as revealing a possible postural abnormality.

BEHAVIORAL OBJECTIVES

1. The student attains a minimum posture rating score of eighty-five, with no single component score of less than four, on the modified New York Posture Screening Test (grades 3-12). Student performance is assessed by the teacher for grades 3-6 and by the partner for grades 7-12.
2. The student administers the modified New York Posture Screening Test to assess static and dynamic posture.
   Evaluative criteria: discerning anterior-posterior and lateral deviations on a 7-4-1 basis (grades 7-12). Student assesses the posture of his partner.
3. The student performs his exercises properly.
   Evaluative criteria: descriptive exercising material issued in class (grades 3-12). Student performance is assessed by the teacher.
4. The student evidences proper body mechanics during his normal daily pursuits (grades 3-12).
   Evaluative criteria: teacher subjective evaluation of the pupil's performance of locomotor skills (i.e., sitting, rising, lifting an object, etc.) during the school day.

TEST

Administration procedures for posture screening test.[1]

Recommended screening procedures for identifying students with potential body mechanics problems involve the following series of steps (refer to Appendix 14 for Posture Screening Grid Construction Directions):

1. Reproduce New York Posture Rating Charts. (Refer to Figure 6-1.)
   Note: Permission was granted by the New York State Department of Education to reproduce forms as they are no longer available commercially.[2]
2. Use constructed posture grid or Symmetrigraf[3] to screen students. Also have available a tray with a foam rubber insert filled with a foot disinfectant solution; a chair; a stadiometer; and a reasonably bulky object.
3. Students to be tested (maximum of five at a time) should line up alphabetically; as one finishes, he returns to class and sends in the next student. While they wait, boys remove gym shoes, stockings and shirts, and don shorts, and girls remove shoes and stockings, and don bathing suits.
4. The testing sequence involves: height and weight check by an assistant, posture screening to detect static posture (use foot bath solution to provide imprint for detecting flat feet and as a disinfectant); walking to a chair, sitting, rising, lifting and placing an object on the floor as a means of assessing dynamic posture.

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[1] Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child* pp. 63-66

[2] Correspondence with Gerald J. Hase, Supervisor, Health, Physical Education and Recreation.

[3] "Symmetrigraf," Reedco, Inc.

5. The student's total score is a composite of the 13-item New York Posture Rating Test plus anecdotal comments regarding the dynamic movements.
   Note: Although the 13-item test is scored on a 5-3-1 basis, the recommended procedure is to score on a basis of 7-4-1. A perfect score on the New York Test is 65; a maximum score under the proposed procedure would be 91 (the addition of 9 points to all raw scores gives a potential maximum score of 100). This adjustment tends to make the scores more meaningful to the students since they like to view scores in terms of the arbitrary 100 standard.
6. Students with scores of 70 or below, a single-item score of 1, or a composite of a borderline score on the New York Posture Screening Test and poor functional performance in walking, sitting, rising, and raising and lowering an object are to be recommended for a posture examination by the school physician.
   Note: Procedure is used to "screen" students for possible medical referral, or to assess individual progress once they have been referred by the family or school physician. In any event, students cannot be assigned to the D&A Program unless a medical approval form has been signed by the parent and physician and filed in the nurse's office.

Recording form.

Record raw scores on Figure 6-1.

Student learning experience: screening posture of partner; comparing personal assessment with the teacher's assessment.

ASSESSMENT

New York Posture Screening Form

Add up all thirteen scores and add the constant of nine. (The student should be referred to the school nurse for a follow-up examination by the school physician if his total adds up to 70 or less, or any single component score of 1.) (Refer to Table 6-1.)

Objective appraisal

To distinguish between a potential "functional" and "structural" posture problem, the teacher should have the subject suspend himself from the upper rung of a stall bar, or from an overhead ladder. If the problem is functional, an irregular alignment of the spinous processes will be eliminated by the suspended body weight. On the other hand, a structural problem caused by the rigidity of the spinal column will not be corrected.

Note: It will be easier to discern functional or structural problems if, before suspension, the subject bends forward at the waist and the instructor briskly rubs his vertebral prominences with his thumb, or marks the vertebral prominences with a water color marking pen.

If a lateral deviation of the spine is suspected, the teacher should perform two follow-up measurements:

1. Have the subject recline in a supine position and measure with a steel tape, the length of both legs, from the anterior superior spine of the ilium to the internal malleolus.
2. With subject in a standing position, measure the distance from the nearest point of the inner border of each scapula to the vertebra immediately adjacent.

Student learning experience: have students observe, replicate measurements, and discuss the possible cause(s) of abnormality.

Subjective appraisal

Observe student's dynamic posture as he is being "screened." Note peculiarities in walking, sitting, rising, lifting and placing an object on the floor.

PRESCRIPTION

Table 6-2[1] provides a form and procedure for recording raw scores and anecdotal remarks, and furnishes a basis for prescription of posture exercises. The exercises listed below are grouped according to the abnormalities they serve to remedy.[2]

FORWARD HEAD AND NECK

Exercises for Strengthening the Posterior Neck Muscles

OBJECTIVES:

To remove the causes(s) of the deviations.
To teach the correct position of the head and neck.
To strengthen the muscles at the back of the neck.

1. Head Resist the Downward Pressure of the Hands:
   Position: Prone (lie on stomach) on the mat, with the fingers behind the head, and the face and elbows two or three inches above the floor.
   Exercise: The head is held in place while the hands push downward on the back of the head. The head is not to be lifted or permitted to lower. Duration is several seconds. Repeat vigorously several times, with reasonable rest between repetitions.
   Common Faults: Tilting the head backward and the chin upward.
   Raising the head more than two or three inches above the floor.
   Exerting too little pressure with the hands on the back of the head.
2. Head Resist the Downward Pressure of an Assistant:
   Position: Lie on stomach on the mat, arms are straight and held close to the sides of the body.

[1] Vodola, *op cit.*, p. 176.

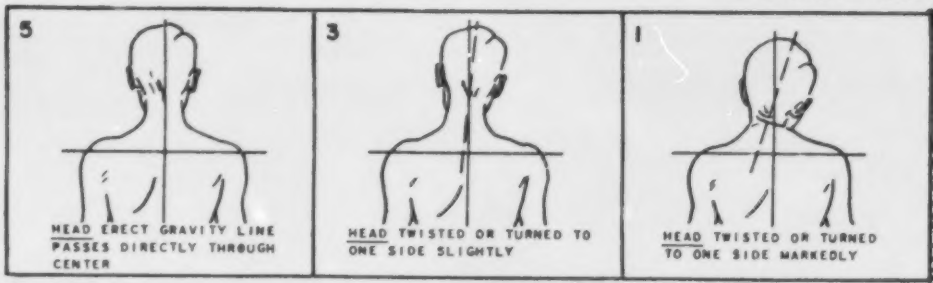
[2] Grover W. Mueller and Josephine Christaldi, *A Practical Program of Remedial Physical Education*, pp. 121-22, 146-47. Permission to publish granted.

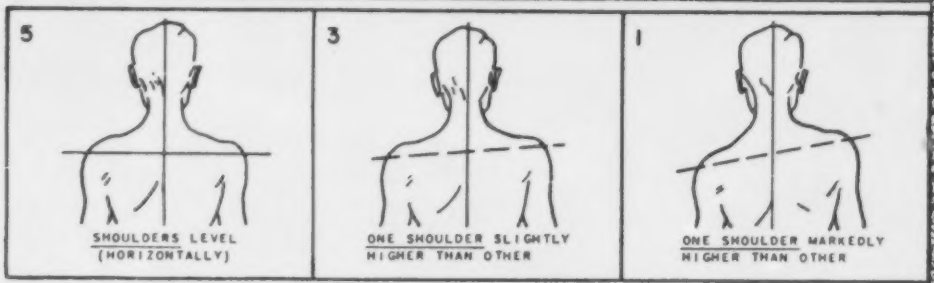
POSTURE RATING CHART

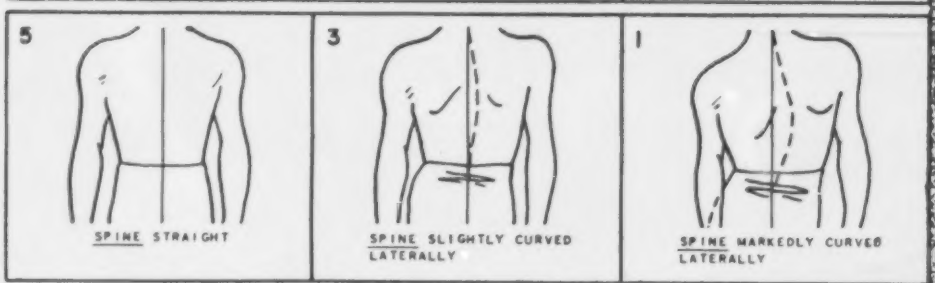
Grade 4 5 6 7 8 9 10 11 12

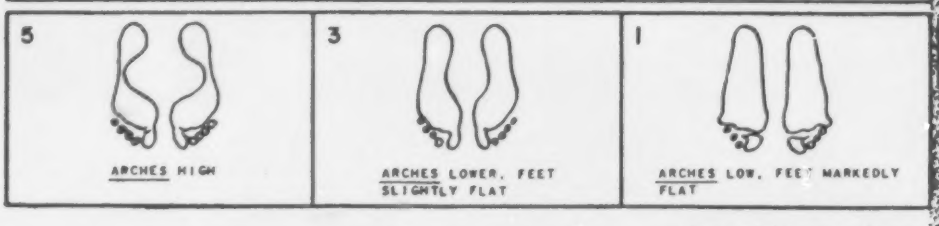
Rater's Initials

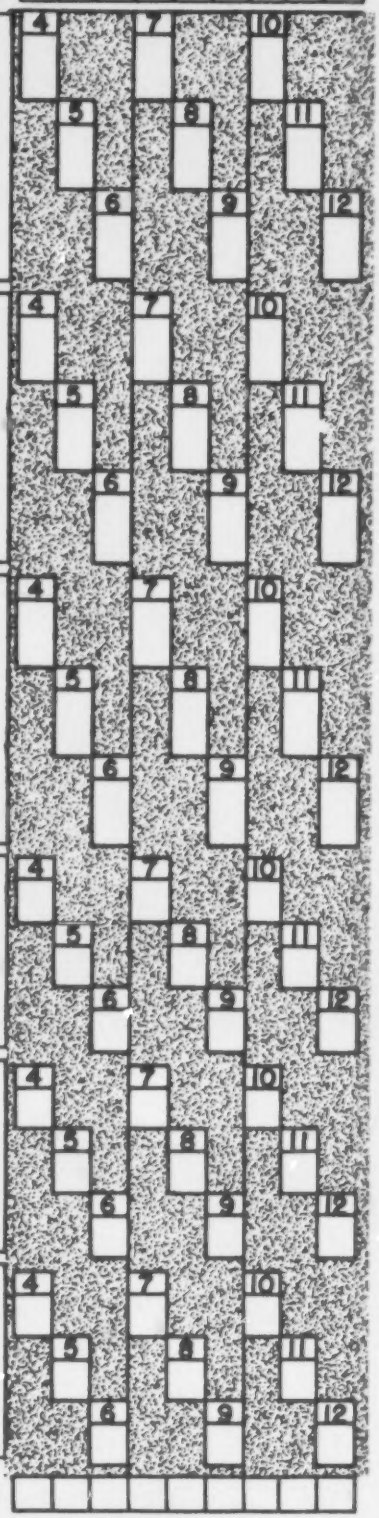
Date of Test


5
HEAD ERECT GRAVITY LINE PASSES DIRECTLY THROUGH CENTER
3
HEAD TWISTED OR TURNED TO ONE SIDE SLIGHTLY
1
HEAD TWISTED OR TURNED TO ONE SIDE MARKEDLY









Total Page One

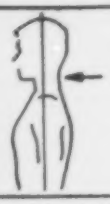
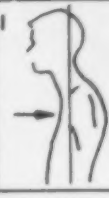
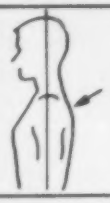
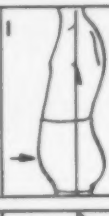
FIG. 6-1 Posture Rating Chart

(Courtesy of New York State Department of Education)

FIG. 6-1 *(Continued)*

Grade 4 5 6 7 8 9 10 11 12

Total Page One

5	 NECK ERECT, CHIN IN, HEAD IN BALANCE DIRECTLY ABOVE SHOULDERS	3 NECK SLIGHTLY FORWARD, CHIN SLIGHTLY OUT	1 NECK MARKEDLY FORWARD, CHIN MARKEDLY OUT
5	CHEST ELEVATED BREASTBONE FURTHEST FORWARD PART OF BODY	3 CHEST SLIGHTLY DEPRESSED	1  CHEST MARKEDLY DEPRESSED (FLAT)
5	 SHOULDERS CENTERED	3 SHOULDERS SLIGHTLY FORWARD	1 SHOULDERS MARKEDLY FORWARD (SHOULDER BLADES PROTRUDING IN REAR)
5	UPPER BACK NORMALLY ROUNDED	3 UPPER BACK SLIGHTLY MORE ROUNDED	1 UPPER BACK MARKEDLY ROUNDED
5	TRUNK ERECT	3 TRUNK INCLINED TO REAR SLIGHTLY	1 TRUNK INCLINED TO REAR MARKEDLY
5	ABDOMEN FLAT	3 ABDOMEN PROTRUDING	1  ABDOMEN PROTRUDING AND SAGGING
5	LOWER BACK NORMALLY CURVED	3 LOWER BACK SLIGHTLY HOLLOW	1 LOWER BACK MARKEDLY HOLLOW

TOTAL RAW SCORE

TO OBTAIN TOTAL RAW SCORE:

1. DETERMINE THE SCORE FOR EACH OF THE ABOVE 13 ITEMS AS FOLLOWS:
   - 5 POINTS IF DESCRIPTION IN LEFT HAND COLUMN APPLIES
   - 3 POINTS IF DESCRIPTION IN MIDDLE COLUMN APPLIES
   - 1 POINT IF DESCRIPTION IN RIGHT HAND COLUMN APPLIES
2. ENTER SCORE FOR EACH ITEM UNDER PROPER GRADE IN THE SCORING COLUMN
3. ADD ALL 13 SCORES AND PLACE TOTAL IN APPROPRIATE SPACE

TABLE 6-1
PHYSICIAN'S POSTURE EXAMINATION FORM

NAME _____ AGE _____ SEX _____ SCHOOL _____

GRADE LEVEL _____ DATE _____

To the Physician: Please check areas in need of special exercises; comment where necessary.

Check

____ A. Forward Head _____

____ B. Round Upper Back _____

____ C. Unilateral Shoulders and Hips _____

____ D. Forward Pelvic Tilt and Flat Back _____

____ E. Backward Pelvic Tilt and Hollow Lower Back _____

____ F. Hyperflexed Knees _____

____ G. Hyperextended Knees _____

____ H. Contracted Arches _____

____ I. Kyphosis _____

____ J. Scoliosis _____

____ K. Single Thoracic Scoliosis _____

____ L. Double Spinal Curvatures _____

____ M. De-rotation of Lateral Spinal Curvatures _____

____ N. Lordosis _____

Physician's Signature _____

(Source: Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child* c 1973, p. 174. Reprinted by permission of Prentice-Hall, Inc., Englewood Cliffs, New Jersey.)

TABLE 6-2

INDIVIDUALLY PRESCRIBED POSTURE EXERCISING PROGRAM BASED ON NEW YORK POSTURE RATING CHART

(Courtesy of the Township of Ocean School District)

I. TEST AND ANALYSIS TEST ITEM		POSTURE ANALYSIS	DATE ___ ___ ___ ___ TEST (SCORES) 1	2	3	4
		Anterior-posterior plane				
1.	Head position	Twisted, or turned (R) (L)	7			
2.	Shoulder level	Drop left (L); drop right (R)	4			
3.	Spinal curvature	"S"; "C"	4			
4.	Hip level	Drop (R) (L)	4			
5.	Foot alignment	Straight, pointed out, pronated	7			
6.	Arches	High, medium, flat	7			
		lateral plane				
7.	Neck position	Erect, *forward*, markedly forward	4			
8.	Chest elevation	Elevated, slightly depressed, markedly depressed (flat)	7			
9.	Shoulder position	Centered *slightly forward*, markedly forward (winged scapulae)	4			
10.	Upper back	Normal, *slightly rounded*, markedly rounded	4			
11.	Trunk position	Erect, *inclined rearward*, markedly inclined rearward	4			
12.	Abdominal posture	Flat, *protruding*, protruding and sagging	4			
13.	Lower back position	Normal curves, slightly hollow, markedly hollow	1			
			61			
		Constant score	9			
			70			

II. PRESCRIBED PROGRAM EXERCISE	BASIS FOR PRESCRIPTION
1. Supine, toe touch overhead. 2. Supine, roll knees to chest, extend. 3. Lateral swinging, overhead ladder. 4. Isometric neck exercise. 5. Shoulder shrug, hold. 6. Stretch right arm overhead (to left), stabilize right hip, derotate spine	1. Point system 7-4-1. 2. Prescribe *two exercises* for each factor for which student scored 1 point; *one exercise* for 4 points.
SYMBOLS: "C" curve: dropped shoulder and raised hip on same side of body "S" curve: dropped shoulder and dropped hip on same side of body. R: Dropped right shoulder, hip, neck, etc. L: Dropped left shoulder, hip, neck, etc.	III. EVALUATION AND RECOMMENDATION

Exercise: The head is held two or three inches above the floor while an assistant pushes downward on the head for several seconds. Repeat several times, with reasonable rest between repetitions.

Common Faults: Same as for number 1. Head resist the downward pressure.

3. Head Resist the Forward Pressure of a Towel:

Position: Sitting or standing, hold towel with both hands behind head.

Exercise: Press the head forcefully backward against the towel while pulling the towel forward vigorously. Some backward movement of the head without tilting it upward or downward is permissible provided strong resistance by the towel is maintained. Hold this position for several seconds. Repeat several times with reasonable rest between repetitions.

Common Faults: Permitting the head to move forward.
Tilting the head backward and the chin upward.
Providing too little pressure with the towel.
Arching the back.

EXERCISES FOR ROUND UPPER BACK

OBJECTIVES:

To lengthen the shortened front chest and neck muscles.

To shorten the lengthened back, neck and shoulder muscles.

1. Wall Push-ups:

Position: Stand facing the wall, at a distance of two of your foot lengths. Place your hands on the wall.

Exercise: Slowly allow the body to lean forward from the ankles (keeping the body straight) until chest touches wall. Hold for a few seconds and push back to standing position. Repeat ten times.

Common Faults: Heels lifted from the floor.
Hips sagged forward.
Head tilted forward or backward.
Doing the exercise too rapidly.
Failure to force the chest forward far enough.

2. Arms Pull Back:

Position: Sitting on a stool or standing straight.

Exercise: Holding your hands together behind your lower back, pull your shoulders back with your arms, trying to touch your shoulder blades together. Hold for four counts. Try to pull your head back (chin in) at the same time. Repeat ten times.

Common Faults: Thrusting the head forward.
Arching the lumbar spine.
Sliding the buttocks from the wall.

3. Arms Straight Out and Pull Back:

Position: Sitting on a stool or standing straight, hold your arms straight out from your shoulders, palms up, and pulling them back trying to touch your shoulder blades.

Exercise: Keeping arms straight and palms up, pull the arms back as far as you can and try to touch your shoulder blades together. Try to pull your head back (chin in) at the same time. Hold for four counts. Repeat ten times.

Common Faults: Thrusting the head forward.
Arching the lumbar spine.
Sliding the buttocks from the wall.

4. Arms Straight Up and Pull Back:

Position: Sitting on a stool or standing straight, hold your arms straight up over your head, palms front.

Exercise: Push arms back trying to touch your shoulder blades together. Try to pull your head back (chin in) at the same time. Hold for four counts. Repeat ten times.

Common Faults: Thrusting the head forward.
Arching the lumbar spine.
Sliding the buttocks from the wall.

EXERCISES FOR LOW SHOULDER

OBJECTIVES:

To maintain spinal flexibility.

To improve the general posture of the person by giving instruction in correct body alignment and mechanics.

To develop a positive attitude toward the use of proper body mechanics in daily living.

1. Trunk Bending Sideward in a Kneeling Position:

Position: Kneeling position on right knee, straight left leg extended directly sideward, straight right arm vertically.

Exercise: Bob trunk three times to left side (over extended leg), keeping arms, head and trunk in good alignment. Return to starting position. Repeat to right side.

Common Faults: Not keeping head and trunk in good alignment.
Insufficiently vigorous sideward bending.

2. Floor Touching to Opposite Sides:

Position: Stand with legs astride and the arms raised sideward at shoulder level.

Exercise: Turn the trunk to the right. Bend the trunk forward, downward and touch the floor with the left hand in front of the right foot. Raise the trunk. Return to starting position. Repeat to the opposite side.

Note: The difficulty of the exercise is increased by touching the floor on the outer side of the heel.

Common Faults: Lifting the left heel from the floor when touching the floor on the right side, or the reverse.
Flexing the left knee when touching the floor on the right side, or the reverse.
Not turning the trunk to the left or right far

enough before bending.
Exerting insufficient effort when performing the exercise.

Fig. 6-2

Lateral Curvature of the Spine (Scoliosis)

3. Trunk Bending Sideward and Rhythmically:
   Position: In a stand with the feet three or four inches apart, with the right arm curved overhead and the left arm across the rear of the body at waist level.
   Exercise: Bend the trunk gradually and rhythmically to the left, vigorously forcing the right arm overhead and the left arm across the back as levers to insure trunk bending as far as possible. Return to the starting position. Repeat to the opposite side.
   Common Faults: Lifting the right heel from the floor when bending left, or the reverse.
   Flexing the left knee when bending left, or the reverse.
   Twisting the body to the left when bending to the left, or the reverse.
   Exerting insufficient effort when performing the exercise.
4. Trunk Bending Sideward, With Hands Clasped Overhead:
   Position: In a stand with the feet three or four inches apart, and the hands clasped overhead with the arms straight.
   Exercise: Bend the trunk to the left side. Return to the starting position. Repeat to the right side.
   Note: This lateral trunk bending exercise may be performed by grasping a wand overhead with the hands fairly close together.
   Common Faults: Rotating the pelvis to the left or to the right.
   Raising the right heel when bending the trunk to the left, or the reverse.
   Bending the knee on the side to which the trunk is bent.
   Exerting insufficient effort when performing the exercise.

EXERCISES FOR LORDOSIS (SWAY BACK)

Exercise to increase the flexibility of the back extensors, the hamstrings, and the gastrocnemius and soleus muscles.

1. Half Backward Roll:
   Position: Lying on your back on the floor, with the knees bent and the feet close to the body, and the arms along the sides of the body.
   Exercise: Draw the knees toward the chest. Straighten the knees so that the straight legs are over the head and body, parallel to the floor. In this position, the back should be rounded as much as possible, the buttocks should not be beyond the head, and the legs should be kept as close to the body and head as possible. Hold this position for four counts. Return to starting position and repeat ten times.
   Common Faults: Bending the knees when they should be straight.
   Permitting much of the weight to be borne by the shoulders and neck.
2. Dipping Downward on the Stall Bars:
   Position: Correct standing position facing the stall bars at arm length distance, with the hands shoulder width apart, grasping the rung which is at shoulder height, and the feet placed on the bottom rung with the heels on the mat.
   Exercise: Bend at the hips and bend the body (with rounded back) keeping the legs straight. Then move the hands successively to the next lower rung, the body is dipped downward three times at each rung. The person continues this process until she reaches the lowest rung within her ability. Then she places her feet on the mat and straightens to a stand. Repeat six times.
   Common Faults: Flexing the knees.
   Failing to progress to a bar as low as possible.
3. Wall Roll Up:
   Position: Stand, back against wall, heels four to six inches from wall.
   Exercise: Slowly relax trunk forward. Slowly raise trunk, vertebra by vertebra. Press entire back to wall and extend spine upward. Repeat eight times.

Common Faults: Flexing the knees in an effort to maintain the pelvic tilt.
Moving the buttocks forward from contact with the wall.
Moving the head and shoulders forward from contact with the wall when in the erect position.
Permitting the feet to move forward from the starting position.

EVALUATION

Readminister the modified New York Posture Screening Test at nine-week intervals. Record student achievement on Behavioral Performance Chart (Appendix 13) as follows: posture screening—pre- and post-test scapulae and leg length measurements; and criterion-referenced norms—pass or fail.

If a student achieves a posture rating of eighty-five or better, with no single component score of less than four, he should be referred to the family or school physician for reexamination and possible release from the program. If minimal standards are not achieved, continue the prescriptive program for another nine-week period. Reinforce the need for proper body carriage at all times.

STUDENT LEARNING EXPERIENCES

1. *Screen Posture of Partner, Grades 7-12.*
   Teacher's Role. a. Set-up the screening station: provide posture grid, disinfectant, foot basin, chair and object to be picked up. b. Explain and demonstrate the rating technique. c. Pair students and distribute New York Posture Screening Forms, pencils and watercolor marking pens. d. Assist and guide students in the assessment process.
   Student's Role. a. Rate his partner's posture (7-4-1 item basis). Record his partner's composite score. Circle a composite score of seventy or below, or any item score of 1. b. Measure his partner's leg lengths. c. Measure his partner's scapulae displacement from the vertebral column. d. Assess the partner's dynamic posture. e. Review the posture appraisal with his partner and the teacher.

Note: Students appraised as having possible postural abnormalities are to be referred to the school or family physician for examination.

2. *Select a Prescription of Exercises, Grades 9-12.*
   Teacher's Role. a. Review and approve posture ratings of students, or provide prescriptive recommendations of the medical inspector. b. Provide a list of exercises for common postural problems that have been approved by the medical inspector.
   Student's Role. a. Select his exercises from the approved list in accordance with the guidelines established in Table 6-2.

3. *Perform Exercises Designed to Improve or "Arrest" the Identified Problems, Grades 3-12.*
   Teacher's Role. a. Assist the student to be sure he is performing his exercises properly. b. Ask specific questions to aid the student in making valid generalizations. c. Stress the importance of proper body mechanics at all times.
   Student's Role. a. Perform exercises based on personal prescription (grades 9-12) and on teacher's prescription (grades 3-8). b. Perform the same exercises at home (on those days that he does not have D&A). c. Constantly be aware of proper body carriage in all daily pursuits. d. Submit a one-page written report on "the importance of proper body mechanics."

4. *Design and Implement a School Posture Contest, Grades 7-12.*
   Teacher's Role. a. Furnish suggestions and resource materials regarding programs in other schools. b. Assist and guide in all steps of the planning.
   Student's Role. (In cooperation with his classmates) a. Plan the entire program (i.e., student participants, judges, assembly time, etc.). b. Prepare a bulletin board display. c. Write an article for the school and town newspapers. d. Develop a newsletter for release to the community.

CHAPTER SEVEN

NUTRITIONAL DEFICIENCIES

DEFINITION

A nutritional deficiency is defined as an imbalance between the carbohydrate, protein and vitamin intake of the body and the needs of the body for optimal efficiency in daily living. Students whose body weight deviates twenty percent or more above, or below normal are referred to the medical inspector for a possible nutritional deficiency.

Note: Although nutritional deficiency is expressed in terms of the intake of food and expenditure of energy, many problems are of an emotional or medical nature. Thus, "suspected" cases should always be referred to the medical authorities for a thorough examination.

BEHAVIORAL OBJECTIVES

1. The student achieves a "true" body weight of less than ten percent below or above his "predicted" body weight (grades 1-12).
   Evaluative criteria: lecture notes. Student's performance is assessed by the teacher for grades 1-6 and by the partner for grades 7-12.
2. The student determines his "true" body weight, "predicted" body weight and nutritional index (grades 9-12).
   Evaluative criteria: lecture notes. Student performance is assessed by his partner.
3. The student determines his caloric needs to sustain his present body weight and to lose half a pound per week (grades 9-12).
   Evaluative criteria: lecture notes. Student performance is assessed by his partner.
4. The student determines the amount of activity needed to lose half a pound per week (grades 9-12).
   Evaluative criteria: lecture notes. Student performance is assessed by his partner.
5. The student defines the terms "obesity" and "overweight" and differentiates between the two (grades 9-12).
   Evaluative criteria: lecture notes. Student performance is assessed by his partner.
6. The student devises and demonstrates an "endurance circuit" of exercises conducive to losing weight (grades 9-12).
   Evaluative criteria: lecture notes. Student performance is assessed by his partner.
7. The student exhibits a more positive attitude toward physical activity as indicated by the Wear Attitude Inventory.
   Evaluative criteria: ten percent gain in raw score. Student performance is assessed by the teacher.

TEST

Determination of nutritional index.[1]

1. Weighing the student in a gym suit to determine his *actual* body weight.
2. Ascertaining the student's *predicted* body weight on the basis of width-weight measurements.
3. Dividing the student's weight in excess or deficient pounds by his predicted weight.
4. Recording the result of the division as a percentage.
5. Determining skinfold measurements for upper arm, scapula area and side of waist.
6. Deciding classification as a result of nutritional index and skinfold measurements.
   Example:

Student's actual weight	=240
Student's predicted weight	=200
Weight above predicted weight	= 40

$$\text{Nutritional Index} = \frac{40}{200} = 20\%$$

[1] Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child*, p 58.

Note: Procedure is to be used after the physician refers the subject to D&A and approves of the prescription.

Student learning experience: working with partner; performing all measurements (under teacher supervision); computing nutritional index (grades 9-12).

Determining caloric needs to sustain body weight, gain or loss half a pound per week.

The procedure proposed for determining caloric body needs was devised by Bogert.[1] The following mathematical illustration will explain the procedure necessary for determining one's daily caloric intake (DCI), an essential starting point for prescribing a personalized weight control program:

DCI = 1 x 24 x body weight in kilograms

where: a kilogram = 2.2 lbs., and

student's weight = 220 lbs.

by substitution,

DCI = 1 x 24 x 100

=2,400 calories: basal metabolism

+ 500 calories: sedentary activities

2,900

+ 290 calories: 10% of subtotal for assimilation, digestion, etc.

3,190 Total calories needed to sustain 220 lbs.

Vodola[2] contends that:

> With the information provided, the instructor can design a weight program to increase or decrease body weight by one pound per week. Since one pound of body fat is equivalent to 3,500 calories, an increase of 500 calories per day would increase one's body weight by one pound in one week. Conversely, one could lose one pound a week if the caloric intake was reduced 500 calories below the required daily needs. (In both cases, the assumption would be that the activity level remains constant.) Since, as physical educators, we are aware of the values of physical activity in a weight control program, our prescription should involve both a decrease in daily caloric intake plus an increase in physical activity. Thus, it is recommended that the 220 pound student reduce his daily caloric intake by 240 calories to 2,940 calories (3,190 - 250=2,940) and increase his daily physical activity by 250 calories if he wishes to lose one pound per week. If a student wanted to gain one pound per week, he would be requested to increase his daily caloric intake by 750 calories and his physical activity by 250 calories. It may seem strange to increase activity for the undernourished, but a weight gain without proper exercise will merely result in an accumulation of adipose tissue. (Refer to Table 7-1 for Food Substitution Chart.)

Student learning experience: computing DCI; determining caloric needs to gain or lose half a pound per week (grades 9-12).

Determining physical activity needs to gain or lose half a pound per week.

Refer to Table 7-2, Energy Expenditure Chart on pages 130 and 131.

Student learning experience: computing activity needs to gain or lose half a pound per week (grades 9-12).

Preparing weight-reducing motivational chart.[3]

Prepare a chart as illustrated in Figure 7-1. Plot body weight progress at the end of each week. In the illustration, the subject achieved the goal he had established for the ten-week period—the loss of ten pounds.

Student learning experience: plotting body weight progress on Weight-Reducing Motivational Chart.

ASSESSMENT

Objective appraisal

Record data for the aforementioned tests as follows:

Body Weight	**Adipose Tissue**
"true" weight _____	arm _____
"predicted" weight _____	waist _____
nutritional index _____	scapula _____
somatotype _____	

Muscle Girth	**Caloric Needs**
arm _____	D.C.I. _____
waist _____	DCI-250 cal. _____
chest _____	DCI+750 cal. _____
thigh _____	

Subjective assessment

Determine whether the subject is obese, underweight, or overweight by reviewing Nutritional Index, adipose tissue and muscle girth measurements. Examine data in light of the subject's somatotype.

[1] L. Jean Bogert, *Nutrition and Physical Fitness*, 7th ed. p. 64

[2] Vodola, *op. cit.*, p. 169.

[3] Arne L. Olson, "Theory and Practice of Physical Conditioning," 1963

TABLE 7-1
FOOD SUBSTITUTION CHART

In order to reduce your daily caloric intake by *250 calories*, the department has provided the following calorie table. Simply substitute foods for other foods you normally eat until you have reduced your daily intake by *250 calories*.* Please be sure to keep your portions of food constant. The chart will also provide valuable assistance in the selection of balanced, nutritious meals. Good luck on your campaign to rid yourself of excess adipose tissue. (Courtesy of Strasenburgh Laboratories, Rochester, N.Y.)

HOW TO GET RID OF THE CALORIES YOU WILL NEVER MISS

	For this	*Cal*	*Substitute this*	*Cal.*	*Cal. saved*
Beverage	Milk (whole), 8 oz.	160	Buttermilk, skim, 8 oz	90	70
	Prune juice, 8 oz.	200	Tomato juice, 8 oz.	45	155
	Soft drinks, 8 oz.	105	Diet soft drinks, 8 oz.	1	104
	Coffee, cream, 2 ts. sugar	95	Coffee, black, sugar sub	0	95
	Cocoa (all milk), 8 oz.	235	Cocoa, milk & water	140	95
	Choc. malted, 8 oz.	450	Lemonade (sweetened) 8 oz.	100	350
	Beer (1 bottle), 12 oz.	185	Liquor, soda, water, 8 oz.	150	35
Breakfast	Rice flakes, cup	105	Puffed rice, cup	55	50
	Eggs, scrambled, 2	220	Eggs, boiled, poached, 2	160	60
Butter	Butter on toast	170	Apple butter on toast	90	80
Cheese	Cheese, swiss, cream, 1 oz.	105	Cheese, cottage, 1 oz.	25	80
Desserts	Angel food cake, 2"	110	½ melon, cantaloupe	60	50
	Choc. cake, icing, 2"	445	Watermelon, ½, 10" diam.	60	385
	Cheese cake, 2" piece	200	Sponge cake, 2" piece	120	80
	Fruit cake, 2" piece	115	Grapes, 1 cup	65	50
	Pound cake, 1 oz.	140	Plums, 2	50	90
	Iced cupcake, 1	185	Plain cupcake, 1	145	40
	Cookie, 3" diam., 1	120	Vanilla wafer, diet., 1	25	95
	Ice cream, 4 oz.	150	Yogurt, flavored, 4 oz.	60	90
	Pie, apple, ½ of 9" pie	345	Tangerine, fresh	40	305
	Pie, blueberry, 1 piece	290	Blueberries, unsw., ½ cup	45	245
	Pie, cherry, 1 piece	355	Cherries, fresh, ½ cup	40	315
	Pie, custard, 1 piece	280	Banana, 1	85	195
	Pie, meringue, 1 piece	305	Lemon gelatin, ½ cup	70	235
	Pie, peach, 1 piece	280	Peach, fresh, 1	35	245
	Pie, rhubarb, 1 piece	265	Grapefruit, ½	55	210
	Pudding, flavored, ½ cup	140	Pudding, diet, ½ cup	60	80
Fish and fowl	Tuna, canned, 3 oz.	170	Crabmeat, canned, 3 oz.	85	85
	Oysters, fried, 6	250	Oysters in shell, sauce, 6	100	150
	Ocean perch, fried, 4 oz.	260	Bass, 4 oz.	105	155
	Fish sticks, 5 sticks	200	Brook trout, 4 oz.	130	70
	Lobster meat, 2 tbl. butter, 4 oz.	300	Lobster meat, 4 oz. with lemon	95	205
	Duck, roasted, 4 oz.	200	Chicken, roasted, 4 oz.	140	60

	For this	*Cal*	*Substitute this*	*Cal.*	*Cal saved*
Meats	Loin roast, 3½ oz.	340	Pot roast, round, 3½ oz.	200	140
	Rump roast, 3½ oz.	340	Rib roast, 3½ oz.	260	80
	Swiss steak, 3½ oz.	300	Liver, fried, 3½ oz.	210	90
	Hamburger, broiled, 3 oz.	245	Hamburger, lean, 3 oz.	185	60
	Porterhouse steak, 3½ oz.	290	Club steak, 3½ oz.	190	100
	Rib lamb chop, 3 oz.	300	Lamb leg roast, 3 oz.	235	65
	Pork chop, 3 oz.	340	Veal chop, 3 oz.	185	155
	Pork roast, 3 oz.	310	Veal roast, 3 oz.	230	80
	Pork sausage, 3 oz.	405	Ham, broiled, lean, 3 oz.	200	205
Potatoes	Potatoes, fried, 1 cup	480	Potato, baked, 2½ diam.	100	380
	potatoes, mashed, 1 cup	240	Potato, boiled, 2½ diam.	100	140
Salads	Chef salad, oil, 1 tbl.	160	Chef salad, diet, dress.	40	120
	Chef salad, mayonnaise, 1 tbl.	125	Chef salad, diet, dress.	40	85
	Chef salad, roquefort Russian, French, 1 tbl.	105	Chef salad, diet, dress.	40	65
Sandwiches	Club sandwich	375	Open bacon/tomato sand.	200	175
	Peanut butter/jelly	275	Open egg salad	165	110
	Turkey with gravy	300	Open hamburger, lean, 2 oz.	200	100
Snacks	Fudge, 1 oz.	115	Vanilla wafers, diet., 2	50	65
	Peanuts, salted, 1 oz.	190	Apple, 1	70	120
	Peanuts, roasted, 1 cup	800	Grapes, 1 cup	65	735
	Potato chips, 10 med.	115	Pretzels, 10 small sticks	35	80
	Chocolate, 1 oz. bar.	145	Marshmallows, 3	60	85
Soups	Creamed soup, 1 cup	135	Chicken noodle soup, 1 cup	65	70
	Bean soup, 1 cup	170	Beef noodle soup, 1 cup	70	100
	Minestrone soup, 1 cup	105	Beef bouillon, 1 cup	30	75
Vegetables	Baked beans, 1 cup	320	Green beans, 1 cup	30	290
	Lima beans, 1 cup	180	Asparagus, 1 cup	35	145
	Corn, canned, 1 cup	170	Cauliflower, 1 cup	25	145
	Peas, canned, 1 cup	165	Peas, fresh, 1 cup	115	50
	Winter squash, 1 cup	130	Summer squash, 1 cup	30	100
	Succotash, 1 cup	260	Spinach, 1 cup	40	220

*Since cyclamates have been removed from the market, slight inaccuracies exist for such items as diet soft drinks.

TABLE 7-2
ENERGY REQUIREMENTS OF COMMON ACTIVITIES, CAL./MIN.

(Source: Bergen County Cardiac Work Evaluation Unit, Hackensack Hospital, Hackensack, New Jersey. Reprinted by Permission.)

OCCUPATION

Watch repairing	1.6
Typing	1.8
Driving tractor	1.9
Painting, sitting	2.0
Gardening, light	2.1
Armature winding	2.2
Cobbling	2.2
Hammering nails	2.4
Using hand tools	2.5
Radio assembly	2.7
Drive car or truck	2.8
Sewing at machine	2.9
Upholstering	3.0
Saw, power hand	3.1
Planing wood, soft	3.4
Sweep or rake	3.4
Mow lawn, power	3.8
Brick laying	4.0
Plastering	4.0
Tractor ploughing	4.2
Assembly line work	4.5
Pump tire	5.0
Wheel barrow, 115 lbs.	5.0
Horse ploughing	5.9
Saw soft wood	6.3
Carry 50 lbs.	6.7
Carpentry	6.8
Pushing wheel barrow	7.0
Pull, lightly	7.0
Saw hard wood	7.3
Mow lawn by hand	7.7
Digging	8.0
Felling tree	8.0
Shoveling earth	8.5
Ascending stairs 17 lb. load	9.0
Shoveling sand	9.0
Splitting wood	9.0
Planing wood, hard	9.1
Pull hard	10.0
Tending furnace	10.2
Climb ladder	10.4
Chop with ax, pick or sledge hammer	10.8
Chopping trees	12.0
Lift more than 100 lbs.	16.0
Nursing	7.0

SELF CARE

Rest, supine	1.0
Sitting	1.2
Standing, relaxed	1.4
Feeding self, sitting	1.4
Conversation	1.4
Dressing, undressing	2.3
Propulsion wheel chair	2.4
Washing hands, face, standing	2.5
Walking slowly, 1 mile in 24 min.	3.5
Bedside commode	
Dressing, washing shaving	3.8
Showering	4.2
Using bedpan	4.7
Walking downstairs	5.2
Walking (military) 1 mile in 16 min.	5.6
Walking, level, icy street	5.6
Walking moderately fast 1 mi. in 15 min.	6.2
Walking up hill 5% slope	7.2
Ambulation braces and crutches	8.0
Walking fast, 1 mi. in 12.5 min.	8.0
Climbing, descending 2 flights stairs/min.	8.5
Walking level 2½" snow	10.7
Walking up hill 10% slope	13.0

OCCUPATIONAL THERAPY

Leather tooling, reclining	1.2
Making link belt, reclining	1.3
Rug hooking, sitting	1.3
Chip carving, reclining	1.5
Knitting	1.5
Bookbinding	1.6
Copper tooling	1.6
Leather carving, sitting	1.8
Typing	1.8
Painting, sitting	2.0
Weaving, floor loom	2.0
Chisel carving c mallet, standing	2.0
Chisel carving c mallet, sitting	2.2
Power sanding	2.2
Sawing soft wood	6.3
Sawing hard wood	7.3

EXERCISES

Walking slowly, 1 mile in 24 min.	3.5
Cycling, 5.5 mph, 1 mile in 11 min	4.5
Straight leg raising	4.8
Swimming 20 yds/min	5.0
Walking briskly, 1 mile in 20 min.	5.0
Walking (military) 1 mile in 16 min.	5.6
Rowing, alone	6.0
Swimming 30 yds/min.	7.0
Walking fast, 1 mile in 12.5 min.	8.0
Up & down 2 flights of stairs in 1 min.	8.5
*Master two step test	8.5
Deep knee bends 30/min.	9.0
Push-ups, 30/min.	9.0
Running 1 mile, 11 min.	11.0
Cycling 13 mph, 1 mile in 4.5 min.	11.0
Walking 5 mph, 1 mile in 12 min.	11.0
Running 1 mile, 9 min.	14.0
Running 1 mile, 7.5 min.	17.0

TABLE 7-2 *(Continued)*

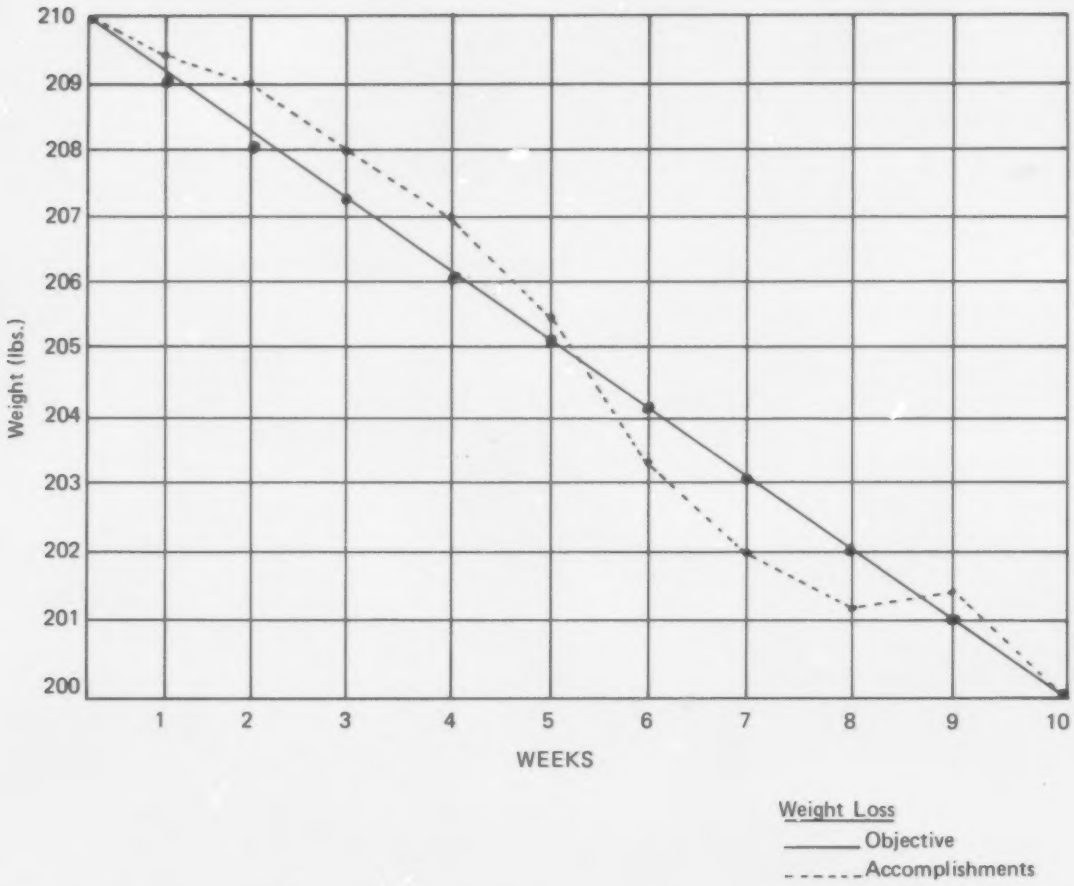
HOUSEWORK

Hand sewing	1.4
Cooking, standing	1.6
Painting	1.6
Sweeping floors, light	1.7
Machine sewing	1.8
Polishing furniture	2.4
Light ironing, standing	2.7
Scrubbing, standing	2.9
Peeling potatoes	2.9
Washing small clothes	3.0
Dusting	3.1
Vacuum cleaning	3.2
Kneading dough	3.3
Scrubbing floors	3.6
Cleaning windows	3.7
Mow lawn, power	3.8
Filling washing machine	4.1
House painting	4.1
Making beds	4.1
Heavy ironing	4.2
Mopping	4.2
Waxing floors	4.2
Wringing by hand	4.4
Hanging wash	4.5
Beating carpets	4.9
Washing floors	5.3
Carrying 20 lbs.	5.3
Putting wash thru hand wringer	5.7
Carrying 50 lbs.	6.7
Shoveling snow moderately wet 10/min.	11.4

RECREATIONAL

Embroidering	1.1
Rug hooking, sitting	1.2
Knitting	1.5
Typing	1.8
Playing cards	2.0
Painting, sitting	2.0
Chisel carving	2.0
Work in garden, light	2.1
Power sanding	2.2
Playing piano	2.5
Driving car	2.8
Golf putting	3.0
Horseback riding, slow	3.0
Volleyball	3.5
Walking slow, 1 mile in 24 min.	3.5
Golf using irons	3.7
Throwing	4.0
Bowling	4.4
Cycling, 1 mile in 11 min.	4.5
Dancing foxtrot	5.5
Gardening, moderate	5.6
Golf, walking c caddie	6.2
Ice skating	6.2
Sawing soft wood	6.3
Table tennis	6.5
Wash/wax car	6.5
Dancing rumba	7.0
Golf, pulling cart	7.0
also carrying bag	7.0
Tennis, doubles	7.1
Sawing hard wood	7.3
Trotting horse	8.0
Canoeing	8.3
Spading	8.6
Skiing, tow, downhill	9.9
Squash	10.2
Cycling, 13 mph 1 mile in 4.5 min.	11.0
Swimming crawl, fast	11.5
Running 1 mile in/10 min.	11.7
Skiing cross country	12.0

THESE VALUES ARE ONLY VERY APPROXIMATE, BUT THEY DO GIVE A RELATIONSHIP BETWEEN ONE ACTIVITY AND ANOTHER. THUS, THIS CHART IS TO BE USED AS A GUIDE ONLY.



*Reproduces from chart suggested by Anne L. Olson in course on Theory and Practice of Physical Conditioning, Temple University, fall 1963.

Fig. 7-1 Weight-Reducing Motivational Chart*

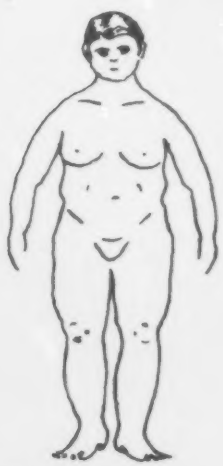


Fig. 7-2 Endo-Mesomorph

PRESCRIPTION

Obesity. If the student is obese, his prescription should include a caloric intake of 250 calories less than his computed DCI and an activity program designed to increase his daily energy expenditure by 250 calories. The subject will thereby expend 500 calories per day, 3,500 calories per week—the equivalent of one pound of adipose tissue.

The exercising regimen should consist of those types of activities that both stimulate the cardiorespiratory system and incorporate the "overload" principle. An example of a "circuit" of exercises is as follows:

1. running in place (100 counts, right foot striking the floor)
2. hopping on right foot (100 repetitions)
3. hopping on left foot (100 repetitions)
4. side straddle hops (100 repetitions)
5. jumping on both feet (100 repetitions)

(one circuit)

The student should attempt to complete as many circuits as he can in a ten or fifteen minute time period. For example, if he completes two circuits and exercises

1 and 2, he records 2.4 on his prescription card. The student's goal is to increase the number of circuits he performs in the ten-minute period. The overload principle can also be used in running distance events by keeping the time constant and increasing the distance covered. (Refer to Table 7-3 for activities for the basic body types.)

Underweight. Prescriptive procedure is to increase caloric intake by 750 calories above computed DCI, and to design an activity program to convert excess intake into muscle tissue. The subject should thereby gain one pound per week.

The exercising regimen should consist of activities that focus on the development of muscular strength rather than endurance, by exercises that stress strengthening muscles with minimal repetitions.

Student learning experience: planning an exercising circuit to lose or gain one pound per week.

EVALUATION

Check weekly progress via Weight-Reducing Motivation Chart. Take adipose tissue and muscle girth measurements at nine-week intervals to note changes in body composition. Refer the student to the medical inspector for release from D&A when body weight is within ten percent of predicted weight or consistent with his somatotype.

Note: Subjects frequently become discouraged because they do not lose weight immediately, or their weight remains constant or even increases after a period of time. Initially, weight loss may not be noticed because of a build-up of fluid which temporarily counterbalances the adipose tissue loss. In time weight loss will be discernible—depending upon initial body composition of adipose tissue and muscle. The subject's weight may remain constant, or actually increase, because of an increase in muscle mass and a decrease in adipose tissue. Thus, it is important to remember that the evaluation must be made only after considering all three factors—body type, muscle girth measurements and adipose tissue deposits.

Record all pre- and post-test data and criterioned-referenced norms on the Behavior Performance Chart (Appendix 13) and on Table 7-4.

TABLE 7-3
ACTIVITIES RECOMMENDED FOR BASIC BODY TYPES

Mesomorphic Endomorphs	Endomorphic Mesomorphs	Extreme Mesomorphs	Ectomorphic Mesomorphs	Mesomorphic Ectomorphs
Table Tennis	Baseball	Sprints	Lightweight Wrestling	Bicycling
Floating (swimming)	Football (lineman)	Basketball	Long-Distance Running	Cross Country
Croquet	Heavyweight Wrestling	Middleweight Boxing	Tennis	Basketball Center (short periods)
Fly and Bait Casting	Swimming	Middleweight Wrestling	Gymnastics	Archery
Bowling	Soccer (backs)	Quarterbacks	Weight Lifting	Also many athletic games, except those requiring weight and sheer strength
	Ice Hockey (backs)	Football (backs)	Javelin	
	Weight Tossing	Divers	Pole Vault	
		Tumbling	High Jump	
		Lacrosse	Fencing	
		Soccer (forwards)	Badminton	
		Ice Hockey (forwards)	Skiing	
		Handball	Jockey	

(Source: Carl E. Willgoose, "Body Type and Physical Fitness," *Journal of Health, Physical Education and Recreation* 27:26-28, September 1956.)

TABLE 7-4
NUTRITION PRESCRIPTION CHART
(Courtesy of the Township of Ocean School District)

STUDENT'S NAME _____ WEIGHT _____ HEIGHT _____ SOMATOTYPE _____

GRADE _____ SCHOOL _____

	DATE:		
True Body Weight			
Predicted Body Weight			
Nutritional Index			
Daily Caloric Intake (DCI)			
Revised DCI (to gain or lose weight)			
Measurements			
Bone Structure			
Chest			
Pelvis			
Adipose Tissue			
Waist			
Triceps			
Scapula			
Muscle Tissue			
Upper Arm			
Chest			
Waist			
Hips			
Buttocks			
Upper Thigh			
Calf			

Food Substitution	Calories (+ / −)	Physical Activities	Time Duration	Calories

STUDENT LEARNING EXPERIENCES

1. *Determine "True," and "Predicted" Body Weight and "Nutritional Index," Grades 9-12.*

   Teacher's Role. a. Define and explain the terms. (1) True Weight—actual body weight (2) Predicted body weight—weight determined via use of Pryor Width-Weight Tables. (Refer to Width-Weight Tables, Table 7-5, at the end of the chapter.) (3) Nutritional index = $\frac{\text{true weight}}{\text{predicted weight}} \times 100$ b. Demonstrate the use of: straight-arm calipers (to measure bone structure); skinfold calipers (to measure adipose tissue); and a measuring tape (to determine muscle girth). c. Provide the necessary scoring forms and pencils. d. Assist and guide students in all measurements and computations.

   Student's Role. a. Take his own measurements, where possible; he is to take the remaining measurements of his partner. b. Perform and record his own computations on Table 7-4. c. Compare his scores with his partner's and note the similarities of differences.

2. *Determine Caloric Intake on an "Average" Day, Grades 9-12.*

   Teacher's Role. a. Define a "calorie" and the relationship of caloric intake to body weight. b. Post and explain the use of the Food Substitution Chart. c. Assist students in interpreting and using the chart.

   Student's Role. a. Compute his caloric intake on a "typical" day. b. Record his caloric intake on the Nutrition Prescription Chart.

3. *Determine Caloric Needs to Sustain Body Weight and to Gain or Lose Half a Pound per Week, Grades 9-12.*

   Teacher's Role. a. Explain the use of Bogert's formula to compute Daily Caloric Intake (DCI).

   DCI = 1 x 24 x body weight in kilograms

   where: a kilogram = 2.2 lbs., and
   student's weight = 220 lbs.

   By substitution.

   DCI = 1 x 24 x 100
   2,400 calories: basal metabolism
   + 500 calories: sedentary activities
   2,900
   + 290 calories = 10% of subtotal for assimilation, digestion, etc.
   3,190 total calories needed to sustain 220 lbs.

   b. Explain procedure necessary to gain or lose one pound per week. 3500 calories = 1 pound of body fat
   Daily 250 caloric increase above DCI = gain in body weight of ½ pound per week.
   Daily 250 caloric decrease below DCI = loss in body weight of ½ pound per week.
   c. Assist students in their computations.

   Student's Role. a. Compute his DCI. b. Revise his DCI in terms of whether to gain or lose weight. c. Compare his calculations with his partner and the teacher.

4. *Determine Physical Activity Needs to Lose Half a Pound Per Week, Grades 9-12.*

   Teacher's Role. a. Explain the effects of increased energy expenditure on caloric intake. b. Explain the types of activities that maximize not only a decrease in fat but also the development of muscle tissue. c. Provide Energy Expenditure Charts. d. Assist students in determining their physical activity needs.

   Student's Role. a. Select the physical activity(ies) and time duration(s) to increase his energy expenditure by 250 calories per day (i.e., lose half a pound per week).

5. *Prepare Caloric and Physical Activity Prescription Chart, Grades 9-12.*

   Teacher's Role. a. Assist and guide students in the use of the Food Substitution Chart and the Energy Expenditure Chart.

   Student's Role. a. If desirous of losing one pound per week, modify his daily eating habits so that he reduces his DCI by 250 calories per day and increases his physical activity to expend an additional 250 calories per day for a daily decrease of 500 calories. b. If desirous of gaining one pound per week, modify his daily eating habits so that he increases his DCI by 750 calories per day and increases his physical activity to expend an additional 250 calories per day for a daily increase of 500 calories. c. List his food substitutions, deletions, physical activities and time durations on his Nutrition Prescription Chart (Table 7-4).

6. *Construct and Plot Weight on Weight Reducing Motivation Chart, Grades 3-12.*

   Teacher's Role. a. Post and explain the use of weight chart. b. Distribute charts and pencils. c. Assist students in listing their weight goals on the chart.

   Student's Role. a. Prepare two charts (one for school and one for home). b. Record his weight and dates each week.

7. *Implement Weight Control Regimen, Grades 3-12.*

   Teacher's Role. a. Plan prescriptions for students in grades 3-8. b. Structure the teaching station so that prescriptions can be implemented. (Refer to Appendix 8 for a suggested station lay-out). c. Assist and guide students in implementing the "overload" principle.

   Student's Role. a. implement prescriptive program on a daily basis. b. Revise prescription periodically. c. Incorporate enjoyable activities to sustain motivation level.

TABLE 7-5

WIDTH-WEIGHT TABLES

For Boys and Girls from 1 to 17 Years — For Men and Women from 18 to 41+ Years

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Concern over body weight arises not only from the decree of fashion but also as a reflection of interest in nutrition and diet as a way to health. Emphasis upon the importance of nutrition is not misplaced. The medical profession has long recognized the importance of proper nutrition and considers nutritional status as an important index of general health and well-being. Many investigators[1] have shown, however, that "normal" weight, as determined by the formerly accepted standards of average weight for sex, height, and age, fails to give adequate information concerning individual nutritional status. This is particularly apparent to physicians who are working with the nutritional problems of the period of growth. Many children and young adults who impress the examiner as being properly nourished appear considerably underweight or overweight when judged by height-weight-age standards. We frequently see children who appear properly nourished but who, because of small bony framework and thin soft tissues, are found to be far below the standard average weight and therefore are reported as malnourished.

Determination of appropriate body weight as an index of nutrition should take into account not only the factors of sex, height, and age but also the nature of the bony framework and the body structure. The individual with large skeletal structure tends to be broad and to have heavy muscle tissues (to support the heavy frame), while the individual with a small skeleton tends to be slender and to have light muscle structure.

People fall into a graded series between the extremes of body build: (1) the linear type, with slender body build, is thin, but not necessarily tall, and usually found high metabolizing; while (2) the lateral type, with broad body build is stocky and heavier with a lower basal-metabolic rate. Since these linear and lateral types of body build are largely determined by inheritance, we should not expect a person who inherits a small skeletal frame and who represents the linear type to weigh as much at the same age and height as does the individual of the lateral type. This is more apparent when it is considered that a large bony framework requires large muscles to operate it, while the lighter frame requires less soft tissue. That the individual of the lateral type with large bony framework has more soft-tissue padding than the linear type has been demonstrated.

Any consideration of weight as a factor in nutrition should depend, therefore, not alone upon the average weight for sex, height, and age but also upon some measurement of the individual's body build. The width-length index[2] has been used successfully to designate body build for children and young adults. Following a study of various body measurements which might be used in indices of body build, the bi-iliac diameter or width of the pelvic crest was selected as the most important and least variable measurement of body width. This measurement is not variable with posture or with respiration, and, since the landmarks are definite, the measuring technique is acquired easily.

The bi-iliac diameter is best measured from the front with straight-arm sliding calipers pressed firmly against the widest flare of the iliac crest. This measurement when divided by the standing height times 1000 yields the width-length index which expresses width of the body in relation to standing height or relative width. A large index number identifies a broad-built person and a small index number, a slender-built person.

For this study body measurements were done on 12,000 people aged from one to forty-one plus years. A steel instrument was used to measure the bi-iliac diameters for 5,000 cases. A hardwood instrument with steel corners was checked with the steel instrument until identical measurements were obtained with each. Thereafter wooden calipers were used. In using either the steel or the wooden instrument the arms of the calipers were tilted slightly upward in measuring girls and slightly downward in measuring boys.

[1] See, for example, L.I. Dublin and J.D. Gebhart, *New York Association for Improving the Condition of the Poor* (1924); C.E. Turner, *Publications of the Massachusetts Institute of Technology, Serial No. 20* (June, 1931); T. Clark, E. Sydenstricker, and S.D. Collins, *Public Health Report No. 39* (1924), p. 518.

[2] See Helen B. Pryor and H.R. Stolz, "Determining Appropriate Weight for Body Build," *Journal of Pediatrics*, Vol. III, No. 4 (October, 1933), p. 608; W.P. Lucas and Helen B. Pryor, "Range and Standard Deviations of Certain Physical Measurements in Healthy Children," *ibid.*, Vol. VI, No. 4 (April, 1935), p. 533.

The measurements obtained were sorted into age-sex groups and the mean width-length index was found for each age and each sex separately. When these mean width-length indices were tabulated, it was seen that females were relatively broader than males at all ages. Babies were relatively broader than pre-adolescent children, and during adolescence girls became much broader in proportion to their height than boys of the same ages.

Width-length indices, calculated every six months over a seven-year period on one hundred adolescent girls and one hundred adolescent boys, were found very reliable in predicting body build during the period of most rapid growth. Correlation of odd and even halves of the test material yielded values from plus. 83 to plus .94 for *r*. On this basis the width-length index appears to be a valid measure of body build, since a child found to be eight per cent broader than the average of his age-sex group at age 10 years was found to have remained approximately eight per cent broader than average when he had attained the age of 14 years. The converse was also true.

However, there are a few people whose body builds or endocrine patterns are hard to identify; for example, when the hips appear to belong to one type and the chest to another. Particularly in adolescent girls when the chest is very narrow and the hips very broad, neither diameter represents body width.

The only body-width measurement used in the first Width-Weight Tables was bi-iliac. The revised Width-Weight Tables take lateral chest measurements into consideration also. Below age six years the addition of lateral thoracic diameter makes a negligible difference in weight prediction.

For each age and each sex correlations were done as follows:

Weight with height;
Weight with bi-iliac diameter;
Weight with thoracic lateral diameter;
Height with thoracic lateral diameter;
Bi-iliac diameter with thoracic lateral diameter;
Height with bi-iliac diameter.

A multiple correlation formula was worked out for each age-sex group to express the relationship between weight and widths of the body. The formula may be expressed as follows:

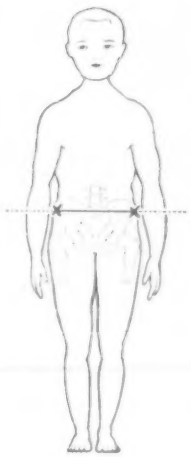
$$W=C-(b\,14.23)\,(L)-(b\,13.24)\,(Bi)-(b12.34\,)\,(H)$$

In the formula W is weight prediction; and b14.23 is the partial correlation of weight and lateral thoracic diameter; b13.24 is the partial correlation of weight and bi-iliac diameter; b12.34 is the partial correlation of weight and height;

C is the constant from the regression formula;
L is lateral thoracic diameter;
Bi is the bi-iliac diameter; and
H is height.

Three different values for L were substituted in the formula to provide tables for the 8, 50, and 92 percentile rankings. The constant from each regression equation was used to calculate weight predictions for each inch of height range at a given age for different hip widths. The mean bi-iliac measurement heads the central column of figures in each table. Bi-iliac intervals above and below the mean head the columns right and left of center. To find the normal weight for body build it is necessary to first find the given height in the left-hand column and then match the bi-iliac diameter against the figures at the head of each column.

Three sets of tables were constructed for each age and sex: one for narrow chests, one for average chests, and one for wide chests. These three sets of tables were constructed to fit the 8, 50, and 92 percentile rankings of lateral thoracic diameters. The same intervals for bi-iliac diameter measurements were used in all three sets of tables. For example, a boy with average hip width and very broad chest would be matched in the center column of the 92 percentile table, while another boy with an average hip measurement and a narrow chest would be matched in the center column of the 8 percentile table.



Revised Width-Weight Tables therefore predict body weight in terms of width of hips and width of chest, as well as height for each age and sex.

1. Take age of child at nearest birthday.
2. Take height at nearest inch.
3. Measure with firm pressure the greatest width at the crest of the ilium, or bi-iliac diameter, as shown in the diagram herewith.
4. Measure with no pressure the width of the chest at the nipple level and at rest.
5. Decide whether the chest is narrow, medium, or wide by consulting the chest measurements shown for that age and sex.
6. In the proper chest-width table, opposite the height measurement and under the bi-iliac diameter measurement, will be found the appropriate weight in pounds for a child of this body build. (If a child's bi-iliac diameter measurement falls between two column headings, it is necessary to interpolate.)

Example: A ten-year-old boy with medium chest is 53 inches tall. His bi-iliac diameter is 19.4 centimeters. Consequently the appropriate weight for his body build is 63 pounds. Whereas if the same boy had a bi-iliac diameter of 23.8 centimeters and a broad chest, he should weigh 80 pounds.

Either sliding or spreading calipers may be used to measure the bi-iliac diameter.

WIDTH-WEIGHT TABLES

BOYS, AGE 1 YEAR

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	11.3	11.8	12.2	13.1	14.0	14.4	14.9
26.....	16	16½	17	18	19	19½	20
27.....	17	17½	18	19	20	20½	21
28.....	18	18½	19	20	21	21½	22
29.....	19	19½	20	21	22	22½	23
30.....	20	20½	21	22	23	23½	24
31.....	20⅞	21½	21⅞	23	24½	24⅞	25½
32.....	21½	22	22⅞	24	25½	25⅞	26½
33.....	23½	24	24⅞	26	27½	27⅞	28½

BOYS, AGE 2 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	12.5	13.0	13.5	14.5	15.5	16.0	16.5
30.....	19⅞	20½	20⅞	22	23½	23⅞	24½
31.....	20⅞	21½	21⅞	23	24½	24⅞	25½
32.....	22½	23	23⅞	25	26½	26⅞	27½
33.....	23½	24	24⅞	26	27½	27⅞	28½
34.....	24½	25	25⅞	27	28½	29	29⅞
35.....	26	26⅞	27½	29	30½	31½	32
36.....	27	27⅞	28½	30	31½	32½	33
37.....	28⅞	29⅞	30½	32	33⅞	34½	35½

BOYS, AGE 3 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.8	14.4	14.9	16.0	17.1	17.6	18.2
33.....	23½	24	24⅞	26	27½	27⅞	28½
34.....	24½	25	25⅞	27	28½	29	29⅞
35.....	26	26½	27½	29	30½	31½	32
36.....	28	28⅞	29½	31	32½	33½	34
37.....	28⅞	29⅞	30½	32	33⅞	34½	35½
38.....	29⅞	30½	31½	33	34⅞	35½	36½
39.....	31½	32⅞	33½	35	36⅞	37⅞	38½
40.....	32½	33½	34½	36	37⅞	38⅞	39½

BOYS, AGE 4 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.8	15.5	16.0	17.2	18.4	18.9	19.6
35.....	26	26⅞	27½	29	30½	31½	32
36.....	28	28⅞	29½	31	32½	33½	34
37.....	28⅞	29⅞	30½	32	33⅞	34½	35½
38.....	29⅞	30½	31½	33	34⅞	35½	36½
39.....	31½	32⅞	33½	35	36⅞	37⅞	38½
40.....	32½	33½	34½	36	37⅞	38⅞	39½
41.....	34½	35½	36½	38	39⅞	40⅞	41⅞
42.....	35	36	37	39	41	42	43
43.....	37	38	39	41	43	44	45

BOYS, AGE 5 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.6	16.3	16.8	18.1	19.4	19.9	20.6
37.....	28⅞	29⅞	30½	32	33⅞	34½	35½
38.....	30½	31½	32½	34	35⅞	36⅞	37½
39.....	31½	32⅞	33½	35	36⅞	37⅞	38½
40.....	32½	33½	34½	36	37⅞	38⅞	39½
41.....	34½	35½	36½	38	39⅞	40⅞	41⅞
42.....	35	36	37	39	41	42	43
43.....	37	38	39	41	43	44	45
44.....	38⅞	39⅞	40⅞	43	45½	46½	47½
45.....	40½	41½	42⅞	45	47½	48½	49½

The width of the iliac crest is shown in centimeters, since most instruments for measuring width are calibrated in centimeters. For height, inches alone are shown, since height is usually measured in them. Width measurements should be done next to the skin. This is usually possible without completely undressing the child. The weights recorded are without clothes. For school weighing with clothes, allow one pound for heights 38–40 inches and two pounds for heights above 40 inches.

GIRLS, AGE 1 YEAR

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	11.5	12.0	12.4	13.3	14.2	14.6	15.1
26.....	15	15½	16	17	18	18½	19
27.....	16	16½	17	18	19	19½	20
28.....	17	17½	18	19	20	20½	21
29.....	18	18½	19	20	21	21½	22
30.....	19	19½	20	21	22	22½	23
31.....	20	20½	21	22	23	23½	24
32.....	20⅞	21½	21⅞	23	24½	24⅞	25½

GIRLS, AGE 2 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	12.4	13.0	13.4	14.4	15.4	15.8	16.4
30.....	19	19½	20	21	22	22½	23
31.....	20⅞	21½	21⅞	23	24½	24⅞	25½
32.....	21½	22	22⅞	24	25½	25⅞	26½
33.....	22½	23	23⅞	25	26½	26⅞	27½
34.....	23½	24	24⅞	26	27½	27⅞	28½
35.....	25	25⅞	26½	28	29½	30½	31
36.....	27	27⅞	28½	30	31½	32½	33
37.....	28	28⅞	29½	31	32½	33½	34

GIRLS, AGE 3 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.7	14.3	14.8	15.9	17.0	17.5	18.1
32.....	22½	23	23⅞	25	26½	26⅞	27½
33.....	23½	24	24⅞	26	27½	27⅞	28½
34.....	24½	25	25⅞	27	28½	29	29⅞
35.....	26	26⅞	27½	29	30½	31½	32
36.....	27	27⅞	28½	30	31½	32½	33
37.....	28	28⅞	29½	31	32½	33½	34
38.....	29⅞	30½	31½	33	34⅞	35½	36½
39.....	30½	31½	32½	34	35⅞	36½	37½
40.....	31½	32⅞	33½	35	36⅞	37⅞	38½

GIRLS, AGE 4 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.1	15.6	16.1	17.3	18.5	19.0	19.5
35.....	26	26⅞	27½	29	30½	31½	32
36.....	27	27⅞	28½	30	31½	32½	33
37.....	28	28⅞	29½	31	32½	33½	34
38.....	29⅞	30½	31½	33	34⅞	35½	36½
39.....	30½	31½	32½	34	35⅞	36½	37½
40.....	32½	33½	34½	36	37⅞	38⅞	39½
41.....	33½	34½	35½	37	38⅞	39⅞	40⅞
42.....	35	36	37	39	41	42	43
43.....	36	37	38	40	42	43	44

GIRLS, AGE 5 YEARS

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.2	15.8	16.4	17.6	18.8	19.4	20.0
36.....	28	28⅞	29½	31	32½	33½	34
37.....	28⅞	29⅞	30½	32	33⅞	34½	35½
38.....	29⅞	30½	31½	33	34⅞	35½	36½
39.....	30½	31½	32½	34	35⅞	36½	37½
40.....	32½	33½	34½	36	37⅞	38⅞	39½
41.....	33½	34½	35½	37	38⅞	39⅞	40⅞
42.....	35	36	37	39	41	42	43
43.....	37	38	39	41	43	44	45
44.....	37⅞	38⅞	39⅞	42	44½	45½	46½

Children who are extremely tall or extremely short for their chronological ages should be referred to the tables where their heights fall in the middle of the range. For example, if a seven-year-old boy is average height for age eleven, he often is found to be eleven years broad as well as eleven years tall. His developmental age is ahead of his chronological age. Judging an oversized or undersized child by standards for his developmental age does away with distortion at extremes of height within each age group.

CONVERSION TABLE—CENTIMETERS TO INCHES

cm.	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
11	4.3	4.4	4.4	4.4	4.5	4.5	4.5	4.6	4.6	4.7
12	4.7	4.8	4.8	4.8	4.9	4.9	4.9	5.0	5.0	5.0
13	5.1	5.2	5.2	5.2	5.3	5.3	5.3	5.4	5.4	5.5
14	5.5	5.5	5.6	5.6	5.7	5.7	5.7	5.8	5.8	5.9
15	5.9	5.9	5.9	6.0	6.1	6.1	6.1	6.1	6.2	6.2
16	6.3	6.3	6.4	6.4	6.4	6.5	6.5	6.6	6.6	6.6
17	6.7	6.7	6.8	6.8	6.8	6.9	6.9	6.9	7.0	7.0
18	7.1	7.1	7.2	7.2	7.2	7.3	7.3	7.4	7.4	7.4
19	7.5	7.5	7.5	7.6	7.6	7.7	7.7	7.7	7.8	7.8
20	7.9	7.9	7.9	7.9	8.0	8.1	8.1	8.1	8.2	8.2
21	8.3	8.3	8.3	8.4	8.4	8.4	8.5	8.5	8.6	8.6
22	8.7	8.7	8.7	8.8	8.8	8.8	8.9	8.9	8.9	9.0
23	9.1	9.1	9.1	9.2	9.2	9.2	9.3	9.3	9.4	9.4
24	9.4	9.5	9.5	9.5	9.6	9.6	9.7	9.7	9.8	9.8
25	9.8	9.9	9.9	9.9	10.0	10.0	10.1	10.1	10.1	10.2
26	10.2	10.3	10.3	10.3	10.4	10.4	10.5	10.5	10.5	10.6
27	10.6	10.7	10.7	10.7	10.8	10.8	10.9	10.9	10.9	10.9
28	11.0	11.1	11.1	11.1	11.2	11.2	11.3	11.3	11.3	11.4
29	11.4	11.4	11.5	11.5	11.6	11.6	11.6	11.7	11.7	11.8
30	11.8	11.8	11.9	11.9	11.9	12.0	12.0	12.1	12.1	12.2
31	12.2	12.2	12.3	12.3	12.3	12.4	12.4	12.5	12.5	12.5
32	12.6	12.6	12.7	12.7	12.7	12.8	12.8	12.9	12.9	12.9

BOYS, AGE 6 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 17.5 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.4	16.4	18.5	20.6	21.6	23.1
38	25	26	27	29	30	31	32
39	27	28	29	31	32	33	34
40	29	30	31	33	34	35	36
41	31	32	33	35	36	37	38
42	33	34	35	37	38	39	40
43	35	36	37	39	40	41	42
44	37	38	39	41	42	43	44
45	39	40	41	43	44	45	46
46	41	42	43	45	46	47	48
47	43	44	45	47	48	49	50
48	45	46	47	49	50	51	52
49	47	48	49	51	52	53	54
50	49	50	51	53	54	55	56

FOR MEDIUM CHEST

Thoracic Lateral Width, 17.6 to 19.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.4	16.4	18.5	20.6	21.6	23.1
38	28	29	30	31	33	34	35
39	30	31	32	33	35	36	37
40	32	33	34	35	37	38	39
41	34	35	36	37	39	40	41
42	36	37	38	39	41	42	43
43	38	39	40	41	43	44	45
44	40	41	42	43	45	46	47
45	42	43	44	45	47	48	49
46	44	45	46	47	49	50	51
47	46	47	48	49	51	52	53
48	48	49	49	51	53	54	55
49	50	51	51	53	55	55	57
50	52	53	53	55	57	57	59

FOR BROAD CHEST

Thoracic Lateral Width, 19.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.4	16.4	18.5	20.6	21.6	23.1
38	29	31	31	33	35	35	36
39	31	33	33	35	37	37	38
40	33	35	35	37	39	39	40
41	35	36	37	39	40	41	42
42	37	38	39	41	42	43	44
43	39	40	41	43	44	45	46
44	41	42	43	45	46	47	48
45	43	44	45	47	48	49	50
46	45	46	47	49	50	51	52
47	47	48	49	51	52	53	54
48	49	50	51	53	54	55	56
49	51	52	53	55	56	57	58
50	53	54	55	57	58	59	60

BOYS, AGE 7 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.5	16.1	17.1	19.3	21.5	22.5	24.1
41	35	37	37	39	41	42	43
42	37	38	39	40	42	43	44
43	38	39	40	42	43	44	45
44	39	41	41	43	45	46	47
45	41	42	43	45	46	47	48
46	42	43	44	46	48	48	50
47	44	45	46	47	49	50	51
48	45	46	47	49	50	51	52
49	46	48	48	50	52	53	54
50	48	49	50	51	53	54	55
51	49	50	51	53	55	55	57
52	51	52	53	54	56	57	58
53	52	53	54	56	57	58	59

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.3 to 20.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.5	16.1	17.1	19.3	21.5	22.5	24.1
41	41	42	43	44	46	47	48
42	42	43	44	46	48	48	50
43	43	45	45	47	49	50	51
44	45	46	47	49	50	51	52
45	46	47	48	50	52	52	54
46	48	49	50	51	53	54	55
47	49	50	51	53	54	55	56
48	50	52	52	54	56	57	58
49	52	53	54	55	57	58	59
50	53	54	55	57	59	59	61
51	55	56	57	58	60	61	62
52	56	57	58	60	61	62	63
53	57	59	59	61	63	63	65

FOR BROAD CHEST

Thoracic Lateral Width, 20.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.5	16.1	17.1	19.3	21.5	22.5	24.1
41	47	48	49	50	52	53	54
42	48	49	50	52	53	54	55
43	49	51	51	53	55	56	57
44	51	52	53	54	56	57	58
45	52	53	54	56	58	58	60
46	54	55	56	57	59	60	61
47	55	56	57	59	60	61	62
48	56	58	58	60	62	62	64
49	58	59	60	61	63	64	65
50	59	60	61	63	64	65	66
51	60	62	62	64	66	67	68
52	62	63	64	66	67	68	69
53	63	64	65	67	69	69	71

BOYS, AGE 8 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18.0	20.3	22.6	23.6	25.3
42	35	38	40	42	44	49	54
43	37	40	41	43	45	51	55
44	38	41	42	44	47	52	56
45	39	43	44	46	48	53	57
46	41	44	45	47	49	55	58
47	43	46	47	48	51	56	59
48	44	47	48	50	52	58	61
49	45	48	49	51	54	60	63
50	47	50	51	52	55	61	64
51	49	51	52	54	56	63	66
52	50	53	54	55	58	64	67
53	51	54	55	57	59	66	69
54	52	55	57	58	60	67	70
55	53	57	58	60	62	68	72
56	54	58	59	61	63	69	73

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.3 to 21.1 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18.0	20.3	22.6	23.6	25.3
42	37	41	43	46	49	54	58
43	38	42	44	47	51	55	59
44	39	43	45	48	52	56	60
45	40	44	46	50	53	57	61
46	42	46	48	51	55	58	62
47	43	47	49	52	56	60	64
48	45	49	51	54	58	62	66
49	46	50	52	55	59	63	67
50	48	52	54	57	60	65	69
51	49	53	55	58	62	66	70
52	51	55	57	60	63	68	72
53	53	57	59	61	64	70	74
54	54	58	60	62	65	71	75
55	56	60	62	64	67	73	77
56	57	61	63	66	68	74	78

FOR BROAD CHEST

Thoracic Lateral Width, 21.2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18.0	20.3	22.6	23.6	25.3
42	40	44	46	50	55	57	61
43	41	45	47	52	57	58	62
44	42	46	48	53	58	59	63
45	43	47	49	54	59	60	64
46	45	49	51	56	61	62	66
47	46	50	52	57	62	63	67
48	48	52	54	58	63	65	69
49	49	53	55	60	65	66	70
50	51	55	57	61	66	68	72
51	53	57	59	63	68	70	74
52	55	58	60	65	69	71	75
53	56	60	62	66	70	72	78
54	57	61	63	67	72	74	80
55	58	63	65	69	74	76	82
56	59	65	67	71	76	78	83

BOYS, AGE 9 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.7 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45....	39	42	44	46	49	51	53	55	58
46....	41	44	46	48	50	52	55	57	60
47....	42	46	47	50	52	54	56	58	61
48....	44	47	49	52	54	56	58	60	63
49....	46	49	51	53	55	58	60	61	65
50....	47	50	52	55	57	59	61	63	66
51....	49	52	54	56	58	60	63	65	68
52....	50	53	55	58	60	62	64	66	69
53....	52	55	57	59	61	64	66	68	71
54....	53	57	59	61	63	66	68	69	73
55....	55	58	60	63	65	67	69	71	74
56....	57	60	62	64	66	68	71	73	76
57....	58	61	63	66	68	70	72	74	77
58....	60	63	65	67	69	72	74	76	79

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.6 to 21.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45....	43	46	48	50	52	54	57	59	62
46....	44	48	49	52	54	56	59	60	63
47....	46	49	51	54	56	58	60	62	65
48....	48	51	53	55	57	59	62	63	67
49....	49	52	54	57	59	61	63	65	68
50....	51	54	56	58	60	62	65	67	70
51....	52	55	57	60	62	64	66	68	71
52....	54	57	59	61	63	65	68	70	73
53....	55	59	61	63	65	67	70	72	75
54....	57	60	62	65	67	69	71	73	76
55....	59	62	64	66	68	70	73	75	78
56....	60	63	65	68	70	72	74	76	79
57....	62	65	67	69	71	73	76	78	81
58....	63	67	69	71	73	75	77	79	83

FOR BROAD CHEST

Thoracic Lateral Width, 21.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45....	46	49	51	53	55	57	60	62	65
46....	47	51	53	55	57	59	62	63	67
47....	49	52	54	57	59	61	63	65	68
48....	51	54	56	58	60	62	65	67	70
49....	52	55	57	60	62	64	66	68	71
50....	54	57	59	61	63	65	68	70	73
51....	55	59	61	63	65	67	69	71	75
52....	57	60	62	65	67	69	71	73	76
53....	59	62	64	66	68	70	73	75	78
54....	60	63	65	68	70	72	74	76	79
55....	62	65	67	69	71	73	76	78	81
56....	63	67	69	71	73	75	77	79	83
57....	65	68	70	73	75	77	79	81	84
58....	67	70	72	74	76	78	81	83	86

BOYS, AGE 10 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20.0 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	17.0	18.5	19.4	20.5	21.6	22.7	23.8	24.7	26.2
47....	40	44	46	48	51	54	57	59	63
48....	42	45	48	50	53	56	59	61	65
49....	43	47	49	52	55	58	60	62	66
50....	45	49	51	53	56	59	62	64	68
51....	47	50	53	55	58	61	64	66	70
52....	48	52	54	57	60	63	65	68	71
53....	50	54	56	58	61	64	67	69	73
54....	52	55	58	60	63	66	68	71	75
55....	53	57	59	62	65	68	70	73	76
56....	55	59	61	64	67	70	72	74	78
57....	57	60	63	65	68	71	74	76	80
58....	58	62	64	67	70	73	75	78	81
59....	60	64	66	69	72	75	77	79	83
60....	62	66	68	70	73	76	79	81	85

FOR MEDIUM CHEST

Thoracic Lateral Width, 20.1 to 22.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	17.0	18.5	19.4	20.5	21.6	22.7	23.8	24.7	26.2
47....	47	51	53	55	58	61	64	66	70
48....	49	52	55	57	60	63	66	68	71
49....	50	54	56	59	62	65	67	69	73
50....	52	56	58	60	63	66	69	71	75
51....	54	57	60	62	65	68	71	73	77
52....	55	59	61	64	67	70	72	74	78
53....	57	61	63	65	68	71	74	76	80
54....	59	62	65	67	70	73	76	78	82
55....	60	64	66	69	72	75	77	80	83
56....	62	66	68	70	73	76	79	81	85
57....	64	67	70	72	75	78	81	83	87
58....	65	69	71	74	77	80	82	85	88
59....	67	71	73	75	78	81	84	86	90
60....	69	72	75	77	80	83	86	88	92

FOR BROAD CHEST

Thoracic Lateral Width, 22.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	17.0	18.5	19.4	20.5	21.6	22.7	23.8	24.7	26.2
47....	53	57	59	62	65	68	70	72	76
48....	55	59	61	63	66	69	72	74	78
49....	57	60	63	65	68	71	73	76	79
50....	58	62	64	67	70	73	75	77	81
51....	60	64	66	68	71	74	77	79	83
52....	62	65	68	70	73	76	79	81	84
53....	63	67	69	72	75	78	80	82	86
54....	65	69	71	73	76	79	82	84	88
55....	67	70	73	75	78	81	84	86	89
56....	68	72	74	77	80	83	85	87	91
57....	70	74	76	78	81	84	87	89	93
58....	72	75	78	80	83	86	89	91	95
59....	73	77	79	82	85	88	90	92	96
60....	75	79	81	83	86	89	92	94	98

BOYS, AGE 11 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20.3 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.1	19.5	20.4	21.3	22.3	23.2	24.2	25.1	26.5
49....	46	50	52	55	58	61	63	66	70
50....	48	52	54	57	60	63	65	67	71
51....	49	53	56	58	61	64	67	69	73
52....	51	55	58	60	63	67	69	71	75
53....	53	57	60	62	65	68	70	73	77
54....	55	59	61	64	67	70	72	75	79
55....	57	61	63	66	69	72	74	77	81
56....	58	62	65	67	70	73	76	78	82
57....	60	64	67	69	72	75	78	80	84
58....	62	66	68	71	74	77	79	82	86
59....	64	68	69	73	76	79	81	84	88
60....	66	70	71	75	78	81	83	86	90
61....	67	71	72	76	79	82	85	87	91
62....	69	73	74	78	81	84	87	89	93
63....	71	75	76	80	83	87	88	91	95

FOR MEDIUM CHEST

Thoracic Lateral Width, 20.4 to 23.4 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.1	19.5	20.4	21.3	22.3	23.2	24.2	25.1	26.5
49....	53	57	60	62	65	68	71	73	77
50....	55	59	62	64	67	70	72	75	79
51....	57	61	63	66	69	72	74	77	81
52....	59	63	65	68	71	74	76	79	83
53....	60	64	67	69	72	75	78	80	84
54....	62	66	69	71	74	77	80	82	86
55....	64	68	71	73	76	79	81	84	88
56....	66	70	72	75	78	81	83	86	90
57....	68	72	74	77	80	83	85	88	92
58....	69	73	76	78	81	84	87	89	93
59....	71	75	78	80	83	86	89	91	95
60....	73	77	80	82	85	88	90	93	97
61....	75	79	81	84	87	90	92	95	99
62....	77	81	83	86	89	92	94	97	101
63....	79	83	85	88	91	94	96	98	102

FOR BROAD CHEST

Thoracic Lateral Width, 23.5 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.1	19.5	20.4	21.3	22.3	23.2	24.2	25.1	26.5
49....	62	66	68	71	74	77	79	82	85
50....	63	67	70	72	75	78	81	83	87
51....	65	69	72	74	77	80	83	85	89
52....	67	71	74	76	79	82	84	87	91
53....	69	73	75	78	81	84	86	89	93
54....	71	75	77	80	83	86	88	91	95
55....	72	76	79	81	84	87	90	92	96
56....	74	78	81	83	86	89	92	94	98
57....	76	80	83	85	88	91	93	96	100
58....	78	82	84	87	90	93	95	98	102
59....	80	84	86	89	92	95	97	100	104
60....	81	85	88	90	93	96	99	101	105
61....	83	87	90	92	95	98	101	103	107
62....	85	89	92	94	97	100	102	105	109
63....	87	91	93	96	99	102	104	107	111

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BOYS, AGE 12 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20.8 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.8	20.2	21.1	22.1	23.1	24.1	25.1	26.0	27.4
50....	47	54	58	62	67	72	77	81	87
51....	48	55	59	64	69	74	78	82	89
52....	50	56	60	65	70	75	79	83	90
53....	51	57	62	66	71	76	80	84	91
54....	52	58	63	67	72	77	81	86	92
55....	53	60	64	68	73	78	83	87	93
56....	54	61	65	69	74	79	84	88	95
57....	55	62	66	71	76	81	85	89	96
58....	57	63	67	72	77	82	86	90	97
59....	58	64	69	73	78	83	87	92	98
60....	59	66	70	74	79	84	89	93	99
61....	60	67	71	75	80	85	90	94	101
62....	61	68	72	77	82	87	91	95	102
63....	63	69	73	78	83	88	92	96	103
64....	64	70	75	79	84	89	93	98	104
65....	65	72	76	80	85	90	95	99	105

FOR MEDIUM CHEST

Thoracic Lateral Width, 20.9 to 22.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.8	20.2	21.1	22.1	23.1	24.1	25.1	26.0	27.4
50....	55	61	65	70	75	80	84	88	95
51....	56	62	66	71	76	81	85	89	96
52....	57	63	68	72	77	82	86	91	97
53....	58	65	69	73	78	83	88	92	98
54....	59	66	70	74	79	84	89	93	100
55....	60	67	71	76	81	86	90	94	101
56....	62	68	72	77	82	87	91	95	102
57....	63	69	74	78	83	88	92	97	103
58....	64	71	75	79	84	89	94	98	104
59....	65	72	76	80	85	90	95	99	106
60....	66	73	77	82	87	92	96	100	107
61....	68	74	78	83	88	93	97	101	108
62....	69	75	80	84	89	94	98	103	109
63....	70	77	81	85	90	95	100	104	110
64....	71	78	82	88	91	96	101	105	111
65....	72	79	83	88	93	98	102	106	113

FOR BROAD CHEST

Thoracic Lateral Width, [illegible] cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.8	20.2	21.1	22.1	23.1	24.1	25.1	26.0	27.4
50....	62	69	73	77	82	87	92	96	103
51....	63	70	74	79	84	89	93	97	104
52....	65	71	75	80	85	90	94	98	105
53....	66	72	77	81	86	91	95	100	106
54....	67	74	78	82	87	92	97	101	107
55....	68	75	79	83	88	93	98	102	109
56....	69	76	80	85	90	95	99	103	110
57....	71	77	81	86	91	96	100	104	111
58....	72	78	83	87	92	97	101	106	112
59....	73	80	84	88	93	98	103	107	113
60....	74	81	85	89	94	99	104	108	114
61....	75	82	86	91	96	101	105	109	116
62....	77	83	87	92	97	102	106	110	117
63....	78	84	89	93	98	103	107	111	118
64....	79	85	90	94	99	104	108	113	119
65....	80	87	91	95	100	105	110	114	120

BOYS, AGE 13 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21.8 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.2	20.7	21.6	22.6	23.6	24.6	25.6	26.5	28.0
52....	57	61	64	67	70	73	76	79	84
53....	58	63	66	69	72	75	78	81	85
54....	60	65	68	71	74	77	80	83	87
55....	62	67	69	73	76	79	82	84	89
56....	64	68	71	74	77	80	84	86	91
57....	66	70	73	76	79	82	85	88	93
58....	68	72	75	78	81	84	87	90	95
59....	69	74	77	80	83	86	89	92	96
60....	71	76	79	82	85	88	91	94	98
61....	73	78	80	84	87	90	93	95	100
62....	75	79	82	85	88	91	94	97	102
63....	77	81	84	87	[illegible]	93	96	99	104
64....	79	83	86	89	92	95	98	101	106
65....	80	85	88	91	94	97	100	103	107
66....	82	87	90	93	96	99	102	105	109
67....	84	89	91	94	97	100	104	106	111

FOR MEDIUM CHEST

Thoracic Lateral Width, 21.9 to 25.1 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.2	20.7	21.6	22.6	23.6	24.6	25.6	26.5	28.0
52....	67	72	74	77	80	83	87	89	94
53....	69	73	76	79	82	85	88	91	96
54....	71	75	78	81	84	87	90	93	98
55....	72	77	80	83	86	89	92	95	99
56....	74	79	82	85	88	91	94	97	101
57....	76	81	84	87	90	93	96	99	103
58....	78	83	85	88	91	94	98	100	105
59....	80	84	87	90	93	96	99	102	107
60....	82	86	89	92	95	98	101	104	109
61....	83	88	91	94	97	100	103	106	110
62....	85	90	93	96	99	102	105	108	112
63....	87	92	94	98	101	104	107	110	114
64....	89	94	96	99	102	105	109	111	116
65....	91	95	98	101	104	107	110	113	118
66....	93	97	100	103	106	109	112	115	120
67....	94	99	102	105	108	111	114	117	121

FOR BROAD CHEST

Thoracic Lateral Width, 25.2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.2	20.7	21.6	22.6	23.6	24.6	25.6	26.5	28.0
52....	77	82	84	87	90	93	97	99	103
53....	79	83	86	89	92	95	98	101	105
54....	81	85	88	91	94	97	100	103	107
55....	82	87	90	93	96	99	102	105	109
56....	84	89	92	95	98	101	104	107	111
57....	86	91	94	97	100	103	106	109	113
58....	88	93	95	98	101	104	108	110	114
59....	90	94	97	100	103	106	109	112	116
60....	92	96	99	102	105	108	111	114	118
61....	93	98	101	104	107	110	113	116	120
62....	95	100	103	106	109	112	115	118	122
63....	97	102	104	108	111	114	117	120	124
64....	99	104	106	109	112	115	119	121	125
65....101		105	108	111	114	117	120	123	127
66....103		107	110	113	116	119	122	125	129
67....104		109	112	115	118	121	124	127	131

BOYS, AGE 14 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.5 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.3	21.8	22.7	23.8	24.9	26.0	27.1	28.0	29.5
54....	67	72	75	78	82	86	89	92	97
55....	69	74	77	80	84	88	91	94	99
56....	71	76	79	82	86	90	93	96	101
57....	73	78	81	84	88	92	95	98	103
58....	75	80	83	86	90	94	97	100	105
59....	77	82	85	88	92	96	99	102	107
60....	79	84	87	90	94	98	101	104	109
61....	81	86	89	92	96	100	103	106	111
62....	83	88	91	94	98	102	105	108	113
63....	85	90	92	96	100	104	107	110	115
64....	87	91	94	98	102	106	109	112	117
65....	89	93	96	100	104	108	111	114	119
66....	90	95	98	101	105	109	113	116	120
67....	92	97	100	103	107	111	115	118	122
68....	94	99	102	105	109	113	117	119	124
69....	96	101	104	107	111	115	118	121	126
70....	98	103	106	109	113	117	120	123	128
71....100		105	108	111	115	119	122	125	130

FOR MEDIUM CHEST

Thoracic Lateral Width, 23.6 to 26.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.3	21.8	22.7	23.8	24.9	26.0	27.1	28.0	29.5
54....	80	85	88	91	95	99	102	105	110
55....	82	87	90	93	97	101	104	107	112
56....	84	89	92	95	99	103	106	109	114
57....	86	91	94	97	101	105	108	111	116
58....	88	93	96	99	103	107	110	113	118
59....	90	95	98	101	105	109	112	115	120
60....	92	97	100	103	107	111	114	117	122
61....	94	99	102	105	109	113	116	119	124
62....	96	101	104	107	111	115	118	121	126
63....	98	103	106	109	113	117	120	123	128
64....100		105	107	111	115	119	122	125	130
65....102		106	109	113	117	121	124	127	132
66....104		108	111	115	119	123	126	129	134
67....105		110	113	116	120	124	128	131	135
68....107		112	115	118	122	126	130	132	137
69....109		114	117	120	124	128	131	134	139
70....111		116	119	122	126	130	133	136	141
71....113		118	121	124	128	132	135	138	143

FOR BROAD CHEST

Thoracic Lateral Width, 26.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.3	21.8	22.7	23.8	24.9	26.0	27.1	28.0	29.5
54....	95	100	102	106	110	114	117	120	125
55....	97	101	104	108	112	116	119	122	127
56....	99	103	106	110	114	118	121	124	129
57....100		105	108	111	115	119	123	126	130
58....102		107	110	113	117	121	125	127	132
59....104		109	112	115	119	123	126	129	134
60....106		111	114	117	121	125	128	131	136
61....108		113	116	119	123	127	130	133	138
62....110		115	118	121	125	129	132	135	140
63....112		117	120	123	127	131	134	137	142
64....114		119	122	125	129	133	136	139	144
65....116		121	124	127	131	135	138	141	146
66....118		123	126	129	133	137	140	143	148
67....120		125	128	131	135	139	142	145	150
68....122		127	130	133	137	141	144	147	152
69....124		129	131	135	139	143	146	149	154
70....126		130	133	137	141	145	148	151	156
71....128		132	135	139	143	148	150	153	158

BOYS, AGE 15 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.3 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.7	22.2	23.2	24.3	25.4	26.5	27.6	28.6	30.1
56....	68	71	74	76	79	82	85	87	91
57....	70	74	77	79	82	85	87	90	94
58....	73	77	79	82	85	88	90	93	96
59....	76	80	82	85	88	91	93	95	99
60....	79	82	85	88	90	93	96	98	102
61....	81	85	88	90	93	96	99	101	105
62....	84	88	90	93	96	99	101	104	107
63....	87	91	93	96	99	102	104	106	110
64....	90	93	96	99	101	104	107	109	113
65....	92	96	99	101	104	107	110	112	116
66....	95	99	101	104	107	110	112	115	118
67....	98	102	104	107	110	113	115	118	121
68....	101	104	107	109	112	115	118	120	124
69....	103	107	110	112	115	118	121	123	127
70....	106	110	112	115	118	121	123	126	129
71....	109	113	115	118	121	124	126	129	132
72....	112	115	118	120	123	126	129	131	135
73....	114	118	121	123	126	129	132	134	138
74....	117	121	123	126	129	132	134	137	141

FOR MEDIUM CHEST

Thoracic Lateral Width, 23.4 to 27.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.7	22.2	23.2	24.3	25.4	26.5	27.6	28.6	30.1
56....	84	88	90	93	96	99	101	104	107
57....	87	90	93	95	98	101	104	106	110
58....	89	93	96	98	101	104	107	109	113
59....	92	96	98	101	104	107	109	112	116
60....	95	99	101	104	107	110	112	115	118
61....	98	101	104	106	109	112	115	117	121
62....	101	104	107	109	112	115	118	120	124
63....	103	107	109	112	115	118	120	123	127
64....	106	110	112	115	118	121	123	126	129
65....	109	112	115	117	120	123	126	128	132
66....	112	115	118	120	123	126	129	131	135
67....	114	118	120	123	126	129	131	134	138
68....	117	121	123	126	129	132	134	137	140
69....	120	124	126	128	131	134	137	139	143
70....	123	126	129	131	134	137	140	142	146
71....	125	129	131	134	137	140	142	145	149
72....	128	132	134	137	140	143	145	148	151
73....	131	135	137	139	142	145	148	150	154
74....	134	137	140	142	145	148	151	153	157

FOR BROAD CHEST

Thoracic Lateral Width, 27.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.7	22.2	23.2	24.3	25.4	26.5	27.6	28.6	30.1
56....	102	106	109	111	114	117	120	122	126
57....	105	109	111	114	117	120	122	125	129
58....	108	112	114	117	120	123	125	128	131
59....	111	114	117	119	122	125	128	130	134
60....	113	117	120	122	125	128	131	133	137
61....	116	120	122	125	128	131	133	136	140
62....	119	123	125	128	131	134	136	139	142
63....	122	125	128	130	133	136	139	141	145
64....	125	128	131	133	136	139	142	144	148
65....	127	131	133	136	139	142	144	147	151
66....	130	134	136	139	142	145	147	150	153
67....	133	136	139	141	144	147	150	152	156
68....	136	139	142	144	147	150	153	155	159
69....	138	142	144	147	150	153	155	158	162
70....	141	145	147	150	153	156	158	161	164
71....	144	148	150	152	155	158	161	163	167
72....	147	150	153	155	158	161	164	166	170
73....	149	153	155	158	161	164	166	169	173
74....	152	156	158	161	164	167	169	172	175

BOYS, AGE 16 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 25.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	22.5	23.6	24.9	26.2	27.5	28.8	29.9	31.1
59....	86	90	92	95	98	101	104	106	110
60....	90	93	95	98	101	104	107	109	113
61....	93	96	98	101	104	107	110	112	116
62....	96	99	101	104	107	110	113	115	119
63....	99	101	104	107	110	113	116	118	122
64....	101	104	107	111	113	116	119	121	125
65....	104	107	110	113	116	119	122	124	128
66....	107	110	113	116	119	122	125	127	131
67....	110	113	116	119	121	124	128	130	134
68....	113	116	119	122	124	127	131	133	137
69....	116	119	121	124	127	130	134	136	139
70....	119	121	124	127	130	133	137	139	141
71....	121	123	126	129	132	135	139	141	143
72....	123	125	128	131	134	137	141	143	145
73....	125	128	131	134	137	140	143	145	148
74....	127	131	133	136	139	142	145	147	151

FOR MEDIUM CHEST

Thoracic Lateral Width, 25.2 to 28.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	22.5	23.6	24.9	26.2	27.5	28.8	29.9	31.1
59....	100	104	106	109	112	115	118	120	124
60....	103	107	109	112	115	118	121	123	127
61....	106	110	112	115	118	121	124	126	130
62....	109	113	115	118	121	124	127	129	133
63....	112	116	118	121	124	127	130	132	136
64....	115	119	121	124	127	130	133	135	139
65....	118	121	124	127	130	133	136	138	142
66....	121	124	127	130	133	136	139	141	145
67....	124	127	130	133	136	139	142	144	148
68....	127	130	133	136	139	142	145	147	151
69....	130	133	136	139	142	145	148	150	154
70....	132	136	139	142	145	148	151	153	157
71....	134	138	141	144	147	150	153	155	159
72....	136	140	143	146	149	152	155	157	161
73....	139	143	146	149	152	155	158	160	164
74....	141	145	148	152	155	158	160	162	166

FOR BROAD CHEST

Thoracic Lateral Width, 28.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	22.5	23.6	24.9	26.2	27.5	28.8	29.9	31.1
59....	116	120	122	125	128	131	134	136	140
60....	119	123	125	128	131	134	137	139	143
61....	122	126	128	131	134	137	140	142	146
62....	125	129	131	134	137	140	143	145	149
63....	128	132	134	137	140	143	146	148	152
64....	131	135	137	140	143	146	149	151	155
65....	134	138	140	143	146	149	152	154	158
66....	137	141	143	146	149	152	155	157	161
67....	140	144	146	149	152	155	158	160	164
68....	143	147	149	152	155	158	161	163	167
69....	146	150	152	155	158	161	164	166	170
70....	149	153	155	158	161	164	167	169	173
71....	152	156	158	161	164	167	170	172	176
72....	155	159	161	164	167	170	173	175	179
73....	158	162	164	167	170	173	176	178	182
74....	161	165	167	170	173	176	179	181	185

BOYS, AGE 17 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26.0 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.9	23.4	24.5	25.3	27.2	29.1	29.9	31.0	32.5
61....	108	112	114	115	118	121	122	124	128
62....	110	114	116	116	120	123	124	126	130
63....	112	116	118	118	122	125	126	128	132
64....	114	118	120	120	124	127	128	130	134
65....	116	120	122	122	126	129	130	132	136
66....	118	122	124	124	128	131	132	133	138
67....	120	124	126	126	130	133	134	135	140
68....	122	126	127	128	132	134	136	137	142
69....	123	128	129	130	133	136	137	139	143
70....	125	130	131	132	135	138	139	141	145
71....	127	132	133	134	137	140	141	143	147
72....	129	133	135	135	139	142	143	145	149
73....	131	135	137	137	141	144	145	147	151
74....	133	137	139	139	143	146	147	150	153

FOR MEDIUM CHEST

Thoracic Lateral Width, 26.1 to 29.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.9	23.4	24.5	25.3	27.2	29.1	29.9	31.0	32.5
61....	117	122	123	125	127	130	131	133	137
62....	119	124	125	126	129	132	133	135	139
63....	121	125	127	128	131	134	135	137	141
64....	123	127	129	130	133	136	137	139	143
65....	125	129	131	132	135	138	139	141	145
66....	127	131	133	134	137	140	141	143	147
67....	130	134	136	137	140	143	144	146	150
68....	133	137	139	140	143	146	147	149	153
69....	136	140	142	143	146	149	150	152	156
70....	139	143	145	146	149	152	153	155	159
71....	142	146	148	149	152	155	156	158	162
72....	145	149	151	152	155	158	159	161	165
73....	148	152	154	155	158	161	162	164	168
74....	151	155	157	158	161	164	165	167	171

FOR BROAD CHEST

Thoracic Lateral Width, 29.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.9	23.4	24.5	25.3	27.2	29.1	29.9	31.0	32.5
61....	127	131	133	134	137	140	141	143	147
62....	129	133	135	136	139	142	143	144	149
63....	131	135	137	138	141	143	145	146	151
64....	133	137	139	140	143	146	147	149	153
65....	136	140	142	143	146	149	150	152	156
66....	139	143	145	146	149	152	153	155	159
67....	142	146	148	149	152	155	156	158	162
68....	145	149	151	152	155	158	159	161	165
69....	148	152	154	155	158	161	162	164	168
70....	151	155	157	158	161	164	165	167	171
71....	154	158	160	161	164	167	168	170	174
72....	157	161	163	164	167	170	171	173	177
73....	160	164	166	167	170	173	174	176	180
74....	163	167	169	170	173	176	177	179	183

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MEN, AGE 18 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23.5	24.1	25.3	26.0	28.0	30.0	30.7	31.9	32.5
62....	107	113	116	118	124	130	132	136	142
63....	109	115	118	120	126	132	134	138	144
64....	111	117	120	122	128	134	136	140	146
65....	112	118	122	124	130	136	138	142	148
66....	114	120	124	126	132	138	140	144	150
67....	116	122	126	128	134	140	142	145	151
68....	118	124	128	130	136	142	144	147	153
69....	120	126	130	132	138	144	146	149	155
70....	122	128	132	134	140	146	148	151	157
71....	124	130	134	136	142	148	150	153	159
72....	126	132	135	138	143	149	152	155	161
73....	128	134	137	139	145	151	153	157	163
74....	130	136	139	141	147	153	155	159	165

FOR MEDIUM CHEST

Thoracic Lateral Width, 26.3 to 29.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23.5	24.1	25.3	26.0	28.0	30.0	30.7	31.9	32.5
62....	118	124	128	130	136	142	144	147	153
63....	120	126	130	132	138	144	146	149	155
64....	122	128	132	134	140	146	148	151	157
65....	124	130	134	136	142	148	150	153	159
66....	126	132	135	138	143	149	152	155	161
67....	128	134	137	139	145	151	153	157	163
68....	130	136	139	141	147	153	155	159	165
69....	132	138	141	143	149	155	157	161	167
70....	134	140	143	145	151	157	159	163	169
71....	135	141	145	147	153	159	161	165	171
72....	137	143	147	149	155	161	163	167	173
73....	139	145	149	151	157	163	165	168	174
74....	141	147	151	153	159	165	167	170	177

FOR BROAD CHEST

Thoracic Lateral Width, 29.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23.5	24.1	25.3	26.0	28.0	30.0	30.7	31.9	32.5
62....	128	134	138	140	146	152	154	157	163
63....	130	136	140	142	148	154	156	159	165
64....	132	138	142	144	150	156	158	161	167
65....	134	140	143	146	152	157	160	163	169
66....	136	142	145	147	153	159	161	165	171
67....	138	144	147	149	155	161	163	167	173
68....	140	146	149	151	157	163	165	169	175
69....	142	148	151	153	159	165	167	171	177
70....	143	149	153	155	161	167	169	173	179
71....	145	151	155	157	163	169	171	175	181
72....	147	153	157	159	165	171	173	177	183
73....	149	155	159	161	167	173	175	178	184
74....	151	157	161	163	169	175	177	180	186

MEN, AGE 19–20 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.4	25.6	26.4	27.4	28.4	29.4	30.4	31.2	32.4
63....	117	121	124	127	130	133	136	139	143
64....	119	123	126	129	132	135	138	[illegible]	145
65....	121	125	127	131	134	137	140	143	147
66....	123	127	129	133	136	139	142	145	149
67....	124	128	131	134	137	140	144	146	150
68....	126	130	133	136	139	142	146	148	152
69....	128	132	134	138	141	144	147	150	154
70....	130	134	136	140	143	146	149	152	156
71....	131	135	138	141	144	147	150	153	157
72....	133	137	140	143	146	149	153	155	159
73....	135	139	141	145	148	151	154	157	161
74....	137	141	143	147	150	153	156	159	163
75....	138	142	145	148	151	154	157	160	164

FOR MEDIUM CHEST

Thoracic Lateral Width, 26.2 to 29.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.4	25.6	26.4	27.4	28.4	29.4	30.4	31.2	32.4
63....	127	131	134	137	140	143	147	149	153
64....	129	133	136	139	142	145	149	151	155
65....	131	135	137	141	144	147	150	153	157
66....	133	136	139	143	146	149	152	155	159
67....	134	138	141	144	147	150	154	156	160
68....	136	140	143	146	149	152	156	158	162
69....	138	142	144	148	151	154	157	160	164
70....	140	143	146	150	153	156	159	162	166
71....	141	145	148	151	154	157	161	163	167
72....	143	147	150	153	156	159	163	165	169
73....	145	149	151	155	158	161	164	167	171
74....	147	150	153	157	160	163	166	169	173
75....	148	152	155	158	161	164	168	170	174

FOR BROAD CHEST

Thoracic Lateral Width, 29.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.4	25.6	26.4	27.4	28.4	29.4	30.4	31.2	32.4
63....	137	141	144	147	150	153	157	159	163
64....	139	143	146	149	152	155	159	161	165
65....	141	145	147	151	154	157	160	163	167
66....	143	147	149	153	156	159	162	165	169
67....	144	148	151	154	157	160	164	166	170
68....	146	150	153	156	159	162	166	168	172
69....	148	152	154	158	161	164	167	170	174
70....	150	154	156	160	163	166	169	172	176
71....	151	155	158	161	164	167	171	173	177
72....	153	157	160	163	166	169	173	175	179
73....	155	159	161	165	168	171	174	177	181
74....	157	161	163	167	170	173	176	179	183
75....	158	162	165	168	171	174	178	180	184

MEN, AGE 21–24 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 26.3 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.4	25.6	26.4	27.4	28.4	29.4	30.4	31.2	32.4
63....	118	122	125	128	131	134	137	140	144
64....	120	124	127	130	133	136	139	142	146
65....	122	126	129	132	135	138	141	144	148
66....	124	128	131	134	137	140	143	146	150
67....	125	129	132	135	138	141	144	147	151
68....	127	131	134	137	140	143	146	149	153
69....	129	133	136	139	142	145	148	151	155
70....	131	135	138	141	144	147	150	153	157
71....	133	137	140	143	146	149	152	155	159
72....	135	139	142	145	148	151	154	157	161
73....	136	140	143	146	149	152	155	158	162
74....	137	141	144	147	150	153	156	159	163
75....	139	143	146	149	152	155	158	161	165

FOR MEDIUM CHEST

Thoracic Lateral Width, 26.4 to 29.6 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.4	25.6	26.4	27.4	28.4	29.4	30.4	31.2	32.4
63....	128	132	135	138	141	144	147	150	154
64....	130	134	137	140	143	146	149	152	156
65....	132	136	139	142	145	148	151	154	158
66....	134	138	141	144	147	150	153	156	160
67....	135	139	142	145	148	151	154	157	161
68....	137	141	144	147	150	153	156	159	163
69....	139	143	146	149	152	155	158	161	165
70....	141	145	148	151	154	157	160	163	167
71....	143	147	150	153	156	159	162	165	169
72....	147	150	153	156	159	162	165	168	172
73....	149	152	155	158	161	164	167	170	174
74....	152	155	158	161	164	167	170	173	177
75....	154	157	160	163	166	169	172	175	179

FOR BROAD CHEST

Thoracic Lateral Width, 29.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.4	25.6	26.4	27.4	28.4	29.4	30.4	31.2	32.4
63....	139	143	146	149	152	155	158	161	165
64....	142	146	149	152	155	158	161	164	168
65....	144	148	151	154	157	160	163	166	170
66....	147	151	154	157	160	163	166	169	173
67....	149	153	156	159	162	165	168	171	175
68....	152	156	159	162	165	168	171	174	178
69....	154	158	161	164	167	170	173	176	180
70....	157	161	164	167	170	173	176	179	183
71....	159	163	166	169	172	175	178	181	185
72....	161	165	168	171	174	177	180	183	187
73....	164	168	171	174	177	180	183	186	190
74....	166	170	173	176	179	182	185	188	192
75....	169	173	176	179	182	185	188	191	195

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MEN, AGE 25–30 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 27.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	122	124	127	130	133	136	139	142	144
64	124	126	129	132	135	138	141	144	146
65	126	128	131	134	137	140	143	146	148
66	128	130	133	136	139	142	145	148	150
67	130	132	135	138	141	144	147	150	152
68	131	133	136	139	142	145	148	151	153
69	133	135	138	141	144	147	150	153	155
70	135	137	140	143	146	149	152	155	157
71	137	139	142	145	148	151	153	157	159
72	138	140	143	146	149	152	154	158	161
73	140	142	145	148	151	154	156	160	162
74	142	144	147	150	153	156	158	162	164
75	144	146	149	152	155	158	160	164	166

FOR MEDIUM CHEST

Thoracic Lateral Width, 27.2 to 29.3 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	132	134	137	140	143	146	149	152	154
64	134	136	139	142	145	148	151	154	156
65	136	138	141	144	147	150	152	156	158
66	138	140	143	146	149	152	154	158	160
67	139	141	144	147	150	153	155	159	161
68	141	143	146	149	152	155	157	161	163
69	143	145	148	151	154	157	159	163	165
70	145	147	150	153	156	159	161	165	167
71	147	149	152	155	158	161	163	167	169
72	149	151	154	157	160	163	165	169	172
73	151	153	156	159	162	165	167	171	174
74	153	155	158	161	164	167	169	173	177
75	155	157	160	163	166	169	171	175	179

FOR BROAD CHEST

Thoracic Lateral Width, 29.4 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	142	145	148	151	154	157	160	163	166
64	145	148	151	154	157	160	163	166	169
65	147	150	153	156	159	162	165	168	171
66	150	153	156	159	162	165	168	171	174
67	152	155	158	161	164	167	170	173	176
68	155	158	161	164	167	170	173	176	179
69	157	160	163	166	169	172	175	178	181
70	160	163	166	169	172	175	178	181	184
71	162	165	168	171	174	177	180	183	186
72	164	167	170	173	176	179	182	185	188
73	167	170	173	176	179	182	185	188	191
74	169	172	175	178	181	184	187	190	193
75	172	175	178	181	184	187	190	193	196

MEN, AGE 31–40 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 27.4 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	124	126	129	132	135	138	141	144	146
64	126	128	131	134	137	140	143	146	148
65	128	130	133	136	139	142	145	148	150
66	130	132	135	138	141	144	147	150	152
67	132	134	137	140	143	146	149	152	154
68	133	135	138	141	144	147	150	153	155
69	135	137	140	143	146	149	152	155	157
70	137	139	142	145	148	151	154	157	159
71	139	141	144	147	150	153	155	159	161
72	140	142	145	148	151	154	156	160	163
73	142	144	147	150	153	156	158	162	164
74	144	146	149	152	155	158	160	164	166
75	146	148	151	154	157	160	162	166	168

FOR MEDIUM CHEST

Thoracic Lateral Width, 27.5 to 29.5 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	134	136	139	142	145	148	151	154	156
64	136	138	141	144	147	150	153	156	158
65	138	140	143	146	149	152	154	158	160
66	140	142	145	148	151	154	156	160	162
67	141	143	146	149	152	155	157	161	163
68	143	145	148	151	154	157	159	163	165
69	145	147	150	153	156	159	161	165	167
70	147	149	152	155	158	161	163	167	169
71	149	151	154	157	160	163	165	169	171
72	151	153	156	159	162	165	167	171	173
73	153	155	158	161	164	167	169	173	176
74	155	157	160	163	166	169	171	175	179
75	157	159	162	165	168	171	173	177	181

FOR BROAD CHEST

Thoracic Lateral Width, 29.6 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	144	147	150	153	156	159	162	165	168
64	147	150	153	156	159	162	165	168	171
65	149	152	155	158	161	164	167	170	173
66	151	155	158	161	164	167	170	173	176
67	154	157	160	163	166	169	172	175	178
68	157	160	163	166	169	172	175	178	181
69	159	162	165	168	171	174	177	180	183
70	162	165	168	171	174	177	180	183	186
71	164	167	170	173	176	179	182	185	188
72	166	169	172	175	178	181	184	187	190
73	169	172	175	178	181	184	187	190	193
74	171	174	177	180	183	186	189	192	195
75	174	177	180	183	186	189	192	195	198

MEN, AGE 41 YEARS AND OVER

FOR NARROW CHEST

Thoracic Lateral Width, 27.6 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	126	128	131	134	137	140	143	146	148
64	128	130	133	136	139	142	145	148	150
65	130	132	135	138	141	144	147	150	152
66	132	134	137	140	143	146	149	152	154
67	134	136	139	142	145	148	151	154	156
68	135	137	140	143	146	149	152	155	157
69	137	139	142	145	148	151	154	157	159
70	139	141	144	147	150	153	156	159	161
71	141	143	146	149	152	155	157	161	163
72	142	144	147	150	153	156	158	162	165
73	144	146	149	152	155	158	160	164	166
74	146	148	151	154	157	160	162	166	168
75	148	150	153	156	159	162	164	168	170

FOR MEDIUM CHEST

Thoracic Lateral Width, 27.7 to 29.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	136	138	141	144	147	150	153	156	158
64	138	140	143	146	149	152	155	158	160
65	140	142	145	148	151	154	156	160	162
66	142	144	147	150	153	156	158	162	164
67	143	145	148	151	154	157	159	163	165
68	145	147	150	153	156	159	161	165	167
69	147	149	152	155	158	161	163	167	169
70	149	151	154	157	160	163	165	169	171
71	151	153	156	159	162	165	167	171	173
72	153	155	158	161	164	167	169	173	175
73	155	157	160	163	166	169	171	175	178
74	157	159	162	165	168	171	173	177	181
75	159	161	164	167	170	173	175	179	183

FOR BROAD CHEST

Thoracic Lateral Width, 29.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.2	26.0	27.0	28.0	29.0	30.0	31.0	32.0	32.8
63	146	149	152	155	158	161	164	167	170
64	149	152	155	158	161	164	167	170	173
65	151	154	157	160	163	166	169	172	175
66	153	157	160	163	166	169	172	175	178
67	156	159	162	165	168	171	174	177	180
68	159	162	165	168	171	174	177	180	183
69	161	164	167	170	173	176	179	182	185
70	164	167	170	173	176	179	182	185	188
71	166	169	172	175	178	181	184	187	190
72	168	171	174	177	180	183	186	189	192
73	171	174	177	180	183	186	189	192	195
74	173	176	179	182	185	188	191	194	197
75	176	179	182	185	188	191	194	197	200

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GIRLS, AGE 6 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 16.9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.3	16.2	18.3	20.4	21.3	22.8
38	29	32	34	37	41	43	46
39	30	33	35	38	42	44	47
40	31	34	36	39	43	45	48
41	32	35	37	40	44	46	49
42	34	36	38	42	45	47	50
43	35	37	39	43	46	48	51
44	36	38	40	44	47	49	52
45	37	39	41	45	48	50	53
46	38	40	42	46	50	51	54
47	39	41	43	47	51	52	55
48	40	42	44	48	52	53	56
49	41	43	45	49	53	54	57
50	42	44	46	50	54	55	58

FOR MEDIUM CHEST

Thoracic Lateral Width, 17.0 to 19.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.3	16.2	18.3	20.4	21.3	22.8
38	30	33	35	38	42	44	47
39	31	34	36	39	43	45	48
40	32	35	37	40	44	46	49
41	34	36	38	42	45	47	50
42	35	37	39	43	46	48	51
43	36	38	40	44	47	49	52
44	37	39	41	45	48	50	53
45	38	40	42	46	50	51	54
46	39	41	43	47	51	52	55
47	40	42	44	48	52	53	56
48	41	43	45	49	53	54	57
49	42	44	46	50	54	55	58
50	43	45	47	51	55	56	59

FOR BROAD CHEST

Thoracic Lateral Width, 19.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	13.9	15.3	16.2	18.3	20.4	21.3	22.8
38	32	35	37	40	44	46	49
39	34	36	38	42	45	47	50
40	35	37	39	43	46	48	51
41	36	38	40	44	47	49	52
42	37	39	41	45	48	50	53
43	38	40	42	46	50	51	54
44	39	41	43	47	51	52	55
45	40	42	44	48	52	53	56
46	41	43	45	49	53	54	57
47	42	44	46	50	54	55	58
48	43	45	47	51	55	56	59
49	44	47	48	52	56	57	60
50	45	48	49	53	57	58	61

GIRLS, AGE 7 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 17.6 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.3	15.9	16.8	19.0	21.2	22.1	23.7
40	28	31	33	38	42	44	48
41	29	32	34	39	44	46	49
42	30	34	36	40	45	47	50
43	31	35	37	42	46	48	52
44	33	36	38	43	47	49	53
45	34	37	39	44	49	51	54
46	35	39	41	45	50	52	55
47	37	40	42	47	51	53	57
48	38	41	43	48	53	55	58
49	39	43	44	49	54	56	59
50	40	44	46	50	55	57	60
51	42	45	47	52	56	58	62
52	43	46	48	53	58	60	63
53	44	48	50	54	59	61	64

FOR MEDIUM CHEST

Thoracic Lateral Width, 17.7 to 20.5 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.3	15.9	16.8	19.0	21.2	22.1	23.7
40	31	34	36	41	45	47	51
41	32	35	37	42	47	49	52
42	33	37	39	43	48	50	53
43	35	38	40	45	49	51	55
44	36	39	41	46	51	53	56
45	37	41	42	47	52	54	57
46	38	42	44	48	53	55	58
47	40	43	45	50	54	56	60
48	41	44	46	51	56	58	61
49	42	46	48	52	57	59	62
50	43	47	49	54	58	60	64
51	45	48	50	55	59	61	65
52	46	49	51	56	61	63	66
53	47	51	53	57	62	64	67

FOR BROAD CHEST

Thoracic Lateral Width, 20.6 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	14.3	15.9	16.8	19.0	21.2	22.1	23.7
40	35	39	40	45	50	52	55
41	36	40	42	46	51	53	56
42	38	41	43	48	52	54	58
43	39	42	44	49	54	56	59
44	40	44	46	50	55	57	60
45	41	45	47	52	56	58	62
46	43	46	48	53	58	59	63
47	44	47	49	54	59	61	64
48	45	49	51	55	60	62	65
49	47	50	52	57	61	63	67
50	48	51	53	58	63	65	68
51	49	53	54	59	64	66	69
52	50	54	56	60	65	67	71
53	52	55	57	62	66	68	72

GIRLS, AGE 8 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18.0	20.3	22.6	23.6	25.3
43	32	37	39	45	51	53	58
44	33	38	40	46	52	54	59
45	34	39	41	47	53	55	61
46	35	40	42	48	54	57	62
47	37	42	44	50	56	58	64
48	38	43	45	51	57	59	65
49	39	44	46	52	58	60	66
50	40	45	47	53	59	61	67
51	42	46	48	54	60	62	68
52	43	47	49	55	61	63	69
53	44	48	50	56	62	64	70
54	45	50	52	58	64	66	72
55	47	51	53	59	65	67	73

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.2 to 20.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18.0	20.3	22.6	23.6	25.3
43	35	40	42	48	54	56	61
44	36	41	43	49	55	57	62
45	37	42	44	50	56	58	63
46	38	43	45	51	57	59	64
47	39	44	46	52	58	60	65
48	40	45	47	53	59	61	66
49	41	46	48	54	60	62	67
50	43	48	50	56	62	64	69
51	44	49	51	57	63	65	70
52	45	50	52	58	64	66	71
53	46	51	53	59	65	67	72
54	47	52	54	60	66	68	73
55	48	53	55	61	67	69	74

FOR BROAD CHEST

Thoracic Lateral Width, 20.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS						
	15.3	17.0	18.0	20.3	22.6	23.6	25.3
43	39	44	46	52	58	60	65
44	40	45	47	53	59	61	66
45	41	46	48	54	60	62	67
46	42	47	49	55	61	63	68
47	43	48	50	56	62	64	69
48	44	49	51	57	63	65	70
49	46	51	53	59	65	67	72
50	47	52	54	60	66	68	73
51	48	53	55	61	67	69	74
52	50	55	57	63	69	71	76
53	51	56	58	64	70	72	77
54	52	57	59	65	71	73	78
55	54	59	61	67	73	75	80

GIRLS, AGE 9 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 18.5 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45....	37	41	44	47	50	53	56	59	63
46....	38	42	45	48	51	54	57	60	64
47....	39	43	46	49	52	55	[illegible]	61	65
48....	40	44	47	50	53	56	59	62	66
49....	41	45	48	51	54	57	60	63	67
50....	42	46	49	52	55	58	61	64	68
51....	43	47	50	53	56	59	62	65	69
52....	44	48	51	54	57	60	63	66	70
53....	45	49	52	55	58	61	64	67	71
54....	46	50	53	56	59	62	65	68	72
55....	47	51	54	57	60	63	66	69	73
56....	48	52	55	58	61	64	67	70	74
57....	49	53	56	59	62	65	68	71	75

FOR MEDIUM CHEST

Thoracic Lateral Width, 18.6 to 21.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45....	43	48	51	55	59	62	66	69	74
46....	44	49	52	56	60	63	67	70	75
47....	45	50	53	57	61	64	68	71	76
48....	46	51	54	58	62	65	69	72	77
49....	47	52	55	59	63	66	70	73	78
50....	48	53	56	60	64	67	71	74	79
51....	49	54	57	61	65	68	72	75	80
52....	50	55	58	62	66	69	73	76	81
53....	51	56	59	63	67	70	74	77	82
54....	52	57	60	64	68	71	75	78	83
55....	53	58	61	65	69	72	76	79	84
56....	54	59	62	66	70	73	77	80	85
57....	55	60	63	67	71	74	78	81	86

FOR BROAD CHEST

Thoracic Lateral Width, 21.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	16.6	18.1	19.0	20.0	21.1	22.1	23.2	24.1	25.6
45....	49	54	57	62	65	68	73	76	81
46....	50	55	58	63	66	69	74	77	82
47....	51	56	59	64	67	70	75	78	83
48....	52	57	60	65	68	71	76	79	84
49....	53	58	61	66	69	72	77	80	85
50....	54	59	62	67	70	73	78	81	86
51....	55	60	63	68	71	74	79	82	87
52....	56	61	64	69	72	75	80	83	88
53....	57	62	65	70	73	76	81	84	89
54....	58	63	66	71	74	77	82	85	90
55....	59	64	67	72	75	78	83	86	91
56....	60	65	68	73	76	79	84	87	92
57....	61	66	69	74	77	80	85	88	93

GIRLS, AGE 10 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 19.6 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.4	19.7	20.4	21.2	22.1	22.9	23.8	24.5	25.8
47....	43	46	48	50	52	54	56	58	61
48....	45	48	50	52	54	56	58	60	63
49....	47	50	52	54	56	58	60	62	65
50....	48	52	53	56	58	60	62	63	67
51....	50	53	55	57	59	61	64	65	68
52....	52	55	57	59	61	63	65	67	70
53....	54	57	59	61	63	65	67	69	72
54....	56	59	60	63	65	67	69	71	74
55....	57	61	62	64	66	68	71	72	76
56....	59	62	64	66	68	70	72	74	77
57....	61	64	66	68	70	72	74	76	79
58....	63	66	68	70	72	74	76	78	81
59....	64	68	69	72	74	76	78	80	83
60....	66	69	71	73	75	77	80	81	85

FOR MEDIUM CHEST

Thoracic Lateral Width, 19.7 to 22.9 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.4	19.7	20.4	21.2	22.1	22.9	23.8	24.5	25.8
47....	50	53	55	57	59	61	63	65	68
48....	52	55	57	59	61	63	65	67	70
49....	53	57	58	61	63	65	67	69	72
50....	55	58	60	62	64	66	69	70	74
51....	57	60	62	64	66	68	70	72	75
52....	59	62	64	66	68	70	72	74	77
53....	61	64	66	68	70	72	74	76	79
54....	62	66	67	70	72	74	76	77	81
55....	64	67	69	71	73	75	78	79	82
56....	66	69	71	73	75	77	79	81	84
57....	68	71	73	75	77	79	81	83	86
58....	69	73	74	77	79	81	83	85	88
59....	71	74	76	78	80	82	85	86	90
60....	73	76	78	80	82	84	86	88	91

FOR BROAD CHEST

Thoracic Lateral Width, 23.0 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	18.4	19.7	20.4	21.2	22.1	22.9	23.8	24.5	25.8
47....	58	61	63	65	67	69	72	73	77
48....	60	63	65	67	69	71	73	75	78
49....	62	65	67	69	71	73	75	77	80
50....	64	67	68	71	73	75	77	79	83
51....	65	69	70	72	74	76	79	80	84
52....	67	70	72	74	76	78	80	82	85
53....	69	72	74	76	78	80	82	84	87
54....	71	74	76	78	80	82	84	86	89
55....	72	76	77	80	82	84	86	88	91
56....	74	77	79	81	83	85	88	89	93
57....	76	79	81	83	85	87	89	91	94
58....	78	81	83	85	87	89	91	93	96
59....	80	83	84	87	89	91	93	95	98
60....	81	85	86	88	90	92	95	96	100

GIRLS, AGE 11 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 20.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.6	20.9	21.6	22.4	23.1	23.8	24.6	25.4	26.7
48....	47	52	54	57	59	61	64	67	71
49....	49	53	55	59	61	63	66	68	73
50....	50	55	57	60	62	65	67	70	74
51....	52	56	59	62	64	66	69	71	76
52....	53	58	60	63	65	67	70	73	77
53....	55	59	62	65	67	69	72	74	79
54....	56	61	63	66	68	70	73	76	80
55....	58	62	65	68	70	72	75	78	82
56....	60	64	66	69	71	73	76	79	83
57....	61	65	68	71	73	75	78	81	85
58....	63	67	69	72	74	76	80	82	87
59....	64	69	71	74	76	78	81	84	88
60....	66	70	72	76	78	80	83	85	90
61....	67	72	74	77	79	81	84	87	91
62....	69	73	76	79	81	83	86	88	93

FOR MEDIUM CHEST

Thoracic Lateral Width, 20.3 to 23.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.6	20.9	21.6	22.4	23.1	23.8	24.6	25.4	26.7
48....	57	61	64	67	69	71	74	76	81
49....	58	63	65	68	70	72	75	78	82
50....	60	64	67	70	72	74	77	80	84
51....	62	66	68	71	73	75	78	81	85
52....	63	67	70	73	75	77	80	83	87
53....	65	69	71	74	76	78	81	84	89
54....	66	71	73	76	78	80	83	86	90
55....	68	72	74	77	79	81	85	87	92
56....	69	74	76	79	81	83	86	89	93
57....	71	75	78	81	83	85	88	90	95
58....	72	77	79	82	84	86	89	92	96
59....	74	78	81	84	86	88	91	93	98
60....	75	80	82	85	87	89	92	95	99
61....	77	81	84	87	89	91	94	97	101
62....	79	83	85	88	90	92	95	98	102

FOR BROAD CHEST

Thoracic Lateral Width, 23.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	19.6	20.9	21.6	22.4	23.1	23.8	24.6	25.4	26.7
48....	66	70	73	76	78	80	83	86	90
49....	68	72	74	77	79	81	84	87	92
50....	69	74	76	79	81	83	86	89	93
51....	71	75	77	80	82	84	88	90	95
52....	72	77	79	82	84	86	89	92	96
53....	74	78	81	84	86	88	91	93	98
54....	75	80	82	85	87	89	92	95	99
55....	77	81	84	87	89	91	94	96	101
56....	78	83	85	88	90	92	95	98	102
57....	80	84	87	90	92	94	97	100	104
58....	82	86	88	91	93	95	98	101	105
59....	83	87	90	93	95	97	100	103	107
60....	85	89	91	94	96	98	101	104	109
61....	86	91	93	96	98	100	103	106	110
62....	88	92	94	97	99	101	105	107	113

GIRLS, AGE 12 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	21.6	22.3	23.2	24.1	25.0	25.9	26.6	27.6
50....	49	52	54	57	60	63	66	68	71
51....	50	54	56	59	62	65	68	70	73
52....	52	55	58	61	64	67	69	72	75
53....	54	57	59	62	65	68	71	73	77
54....	56	59	61	64	67	70	73	75	78
55....	57	61	63	66	69	72	75	77	80
56....	59	62	65	68	71	74	76	79	82
57....	61	64	66	69	72	75	78	80	84
58....	63	66	68	71	74	77	80	82	85
59....	64	68	70	73	76	79	82	84	87
60....	66	69	72	75	78	81	83	86	89
61....	68	71	73	76	79	82	85	87	91
62....	70	73	75	78	81	84	87	89	92
63....	71	75	77	80	83	86	89	91	94
64....	73	76	79	82	85	88	90	93	96
65....	75	78	80	83	86	89	92	95	98

FOR MEDIUM CHEST

Thoracic Lateral Width, 21.2 to 25.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	21.6	22.3	23.2	24.1	25.0	25.9	26.6	27.6
50....	61	64	66	69	72	75	78	80	84
51....	63	66	68	71	74	77	80	82	85
52....	64	68	70	73	76	79	82	84	87
53....	66	69	72	74	77	80	83	86	89
54....	68	71	73	76	79	82	85	87	91
55....	70	73	75	78	81	84	87	89	92
56....	71	75	77	80	83	86	89	91	94
57....	73	76	79	81	84	87	90	93	96
58....	75	78	80	83	86	89	92	94	98
59....	77	80	82	85	88	91	94	96	99
60....	78	82	84	87	90	93	96	98	101
61....	80	83	86	89	92	95	97	100	103
62....	82	85	87	90	93	96	99	101	105
63....	84	87	89	92	95	98	101	103	106
64....	85	89	91	94	97	100	103	105	108
65....	87	90	93	96	99	101	104	107	110

FOR BROAD CHEST

Thoracic Lateral Width, 25.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	20.6	21.6	22.3	23.2	24.1	25.0	25.9	26.6	27.6
50....	75	78	80	83	86	89	92	94	98
51....	77	80	82	85	88	91	94	96	99
52....	78	82	84	87	90	93	96	98	101
53....	80	83	86	89	91	94	97	100	103
54....	82	85	87	90	93	96	99	101	105
55....	84	87	89	92	95	98	101	103	106
56....	85	89	91	94	97	100	103	105	108
57....	87	90	93	95	98	101	104	107	110
58....	89	92	94	97	100	103	106	108	112
59....	91	94	96	99	102	105	108	110	113
60....	92	96	98	101	104	107	110	112	115
61....	94	97	100	103	106	109	111	114	117
62....	96	99	101	104	107	110	113	115	119
63....	98	101	103	106	109	112	115	117	120
64....	99	103	105	108	111	114	117	119	122
65....	101	104	107	110	113	116	119	121	124

GIRLS, AGE 13 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21.3 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.0	22.9	23.8	24.7	25.6	26.5	27.4	28.3	29.2
53....	62	65	68	71	74	77	80	83	86
54....	63	66	69	72	75	78	81	84	87
55....	64	67	70	73	76	79	82	85	88
56....	65	68	71	74	77	80	83	86	89
57....	66	69	72	75	78	81	84	87	90
58....	67	70	73	76	79	82	85	88	91
59....	69	72	75	78	81	84	87	90	93
60....	70	73	76	79	82	85	88	91	94
61....	72	75	78	81	84	87	90	93	96
62....	73	76	79	82	85	88	91	94	97
63....	75	78	81	84	87	90	93	96	99
64....	76	79	82	85	88	91	94	97	100
65....	78	81	84	87	90	93	96	99	102
66....	79	82	85	88	91	94	97	100	103
67....	81	84	87	90	93	96	99	102	105
68....	82	86	89	91	94	97	100	103	106

FOR MEDIUM CHEST

Thoracic Lateral Width, 21.4 to 25.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.0	22.9	23.8	24.7	25.6	26.5	27.4	28.3	29.2
53....	74	77	80	83	86	89	92	95	98
54....	75	78	81	84	87	90	93	96	99
55....	76	79	82	85	88	91	94	97	100
56....	77	80	83	86	89	92	95	98	101
57....	78	81	84	87	90	93	96	99	102
58....	79	82	85	88	91	94	97	100	103
59....	81	84	87	90	93	96	99	102	105
60....	82	85	88	91	94	97	100	103	106
61....	84	87	90	93	96	99	102	105	108
62....	85	88	91	94	97	100	103	106	109
63....	87	90	93	96	99	102	105	108	111
64....	88	91	94	97	100	103	106	109	112
65....	90	93	96	99	102	105	108	111	114
66....	91	94	97	100	103	106	109	112	115
67....	93	96	99	102	105	108	111	114	117
68....	94	97	100	103	106	109	112	115	118

FOR BROAD CHEST

Thoracic Lateral Width, 25.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.0	22.9	23.8	24.7	25.6	26.5	27.4	28.3	29.2
53....	76	79	82	85	88	91	94	97	100
54....	77	80	83	86	89	92	95	98	101
55....	78	81	84	87	90	93	96	99	102
56....	79	82	85	88	91	94	97	100	103
57....	80	83	86	89	92	95	98	101	104
58....	81	84	87	90	93	96	99	102	105
59....	83	86	89	92	95	98	101	104	107
60....	84	87	90	93	96	99	102	105	108
61....	86	89	92	95	98	101	104	107	110
62....	87	90	93	96	99	102	105	108	111
63....	89	92	95	98	101	104	107	110	113
64....	90	93	96	99	102	105	108	111	114
65....	92	95	98	101	104	107	110	113	116
66....	93	96	99	102	105	108	111	114	117
67....	95	98	101	104	107	110	113	116	119
68....	96	99	102	105	108	111	114	117	120

GIRLS, AGE 14 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 21.8 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.8	23.1	23.9	24.9	25.8	26.7	27.3	28.1	29.4
55....	72	77	80	84	87	90	92	95	100
56....	73	78	81	85	88	91	94	97	102
57....	74	79	82	86	89	92	95	98	103
58....	76	81	84	88	91	94	96	99	104
59....	77	82	85	89	92	95	98	101	105
60....	78	83	86	90	93	96	99	102	107
61....	80	84	87	92	95	98	100	103	108
62....	81	86	89	93	96	99	101	104	109
63....	82	87	90	94	97	100	103	106	111
64....	83	88	91	95	98	101	104	107	112
65....	85	90	93	97	100	103	105	108	113
66....	86	91	94	98	101	104	107	110	114
67....	87	92	95	99	102	105	108	111	116
68....	89	93	96	101	104	107	109	112	117
69....	90	95	98	102	105	108	110	113	118
70....	91	96	99	103	106	109	112	115	120
71....	92	97	100	104	107	110	113	116	121

FOR MEDIUM CHEST

Thoracic Lateral Width, 21.9 to 24.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.8	23.1	23.9	24.9	25.8	26.7	27.3	28.1	29.4
55....	84	89	92	96	99	102	104	107	112
56....	85	90	93	97	100	103	106	109	113
57....	86	91	94	98	101	104	107	110	115
58....	88	93	96	100	103	106	108	111	116
59....	89	94	97	101	104	107	109	112	117
60....	90	95	98	102	105	108	111	114	119
61....	92	96	99	103	106	109	112	115	120
62....	93	98	101	105	108	111	113	116	121
63....	94	99	102	106	109	112	115	118	122
64....	95	100	103	107	110	113	116	119	124
65....	97	102	104	109	112	115	117	120	125
66....	98	103	106	110	113	116	118	121	126
67....	99	104	107	111	114	117	120	123	128
68....	100	105	108	112	115	118	121	124	129
69....	102	107	110	113	117	120	122	125	130
70....	103	108	111	115	118	121	124	127	131
71....	104	109	112	116	119	122	125	128	133

FOR BROAD CHEST

Thoracic Lateral Width, 24.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	21.8	23.1	23.9	24.9	25.8	26.7	27.3	28.1	29.4
55....	97	101	104	108	111	114	117	120	125
56....	98	103	106	109	112	115	118	121	126
57....	99	104	107	110	113	116	120	123	128
58....	100	105	108	111	114	117	121	124	129
59....	102	107	110	113	116	119	122	125	130
60....	103	108	111	114	117	120	124	127	131
61....	104	109	112	115	118	121	125	128	133
62....	106	110	113	117	120	123	126	129	134
63....	107	112	115	118	121	124	127	130	135
64....	108	113	116	119	122	125	129	132	137
65....	109	114	117	120	123	126	130	133	138
66....	111	116	119	122	125	128	131	134	139
67....	112	117	120	123	126	129	133	136	140
68....	113	118	121	124	127	130	134	137	142
69....	115	119	122	126	129	132	135	138	143
70....	116	121	124	127	130	133	136	139	144
71....	117	122	125	128	131	134	138	141	146

GIRLS, AGE 15 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 22.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.3	23.4	24.5	25.4	26.2	27.0	27.9	29.0	30.1
57....	78	81	85	88	91	94	97	101	105
58....	79	82	86	89	92	95	98	102	106
59....	81	84	88	91	94	97	100	104	108
60....	83	86	90	93	96	99	102	106	110
61....	85	88	92	95	98	101	104	108	112
62....	87	90	94	97	100	103	106	110	114
63....	88	91	95	98	101	104	107	111	115
64....	89	92	96	99	102	105	108	112	116
65....	90	93	97	100	103	106	109	113	117
66....	92	95	99	102	105	108	111	115	119
67....	93	96	100	103	106	109	112	116	120
68....	94	97	101	104	107	110	113	117	121
69....	96	99	103	106	109	112	115	119	123
70....	97	100	104	107	110	113	116	120	124
71....	98	101	105	108	111	114	117	121	125

FOR MEDIUM CHEST

Thoracic Lateral Width, 22.3 to 25.1 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.3	23.4	24.5	25.4	26.2	27.0	27.9	29.0	30.1
57....	89	92	96	99	102	105	108	112	116
58....	90	93	97	100	103	106	109	113	117
59....	92	95	99	102	105	108	111	115	119
60....	94	97	101	104	107	110	113	117	121
61....	95	99	103	106	109	112	115	119	123
62....	97	101	105	108	111	114	117	121	125
63....	98	102	106	109	112	115	118	122	126
64....	99	103	107	110	113	116	119	123	127
65....	100	104	108	111	114	117	120	124	128
66....	102	106	110	113	116	119	122	126	130
67....	103	107	111	114	117	120	123	127	131
68....	104	108	112	115	118	121	124	128	132
69....	106	110	114	117	120	123	126	130	134
70....	107	111	115	118	121	124	127	131	135
71....	108	112	116	119	122	125	128	132	136

FOR BROAD CHEST

Thoracic Lateral Width, 25.2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.3	23.4	24.5	25.4	26.2	27.0	27.9	29.0	30.1
57....	99	103	107	110	113	116	119	123	127
58....	100	104	108	111	114	117	120	124	128
59....	102	106	110	113	116	119	122	126	130
60....	104	108	112	115	118	121	124	128	132
61....	106	110	114	117	120	123	126	130	134
62....	108	112	116	119	122	125	128	132	136
63....	109	113	117	120	123	126	129	133	137
64....	110	114	118	121	124	127	130	134	138
65....	111	115	119	122	125	128	131	135	139
66....	113	117	121	124	127	130	133	137	141
67....	114	118	122	125	128	131	134	138	142
68....	115	119	123	126	129	132	135	139	143
69....	117	121	125	128	131	134	137	141	145
70....	118	122	126	129	132	135	138	142	146
71....	119	123	127	130	133	136	139	143	147

GIRLS, AGE 16 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 22.7 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.9	24.1	24.9	25.7	26.6	27.5	28.4	29.2	30.5
58....	86	89	92	93	96	99	102	104	108
59....	87	90	93	95	98	101	103	105	109
60....	88	92	94	96	99	102	104	106	110
61....	89	93	95	97	100	103	105	107	111
62....	90	94	96	98	101	104	106	108	112
63....	92	95	97	99	102	105	107	109	113
64....	93	96	98	100	103	106	108	111	114
65....	94	97	100	101	104	107	109	112	115
66....	95	98	101	102	105	108	111	113	117
67....	96	99	102	104	107	110	112	114	118
68....	97	101	103	105	108	111	113	115	119
69....	98	102	104	106	109	112	114	116	120
70....	99	103	105	107	110	113	115	117	121
71....	101	104	106	108	111	114	116	119	122

FOR MEDIUM CHEST

Thoracic Lateral Width, 22.8 to 25.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.9	24.1	24.9	25.7	26.6	27.5	28.4	29.2	30.5
58....	93	97	99	101	104	107	109	111	115
59....	94	98	100	102	105	108	110	112	116
60....	96	100	102	104	107	110	112	114	118
61....	98	102	104	106	109	112	114	116	120
62....	99	103	105	107	110	113	115	117	121
63....	101	105	107	109	112	115	117	119	123
64....	103	107	109	111	114	117	119	121	125
65....	105	109	111	113	116	119	121	123	127
66....	106	110	112	114	117	120	122	124	128
67....	108	112	114	116	119	122	124	126	130
68....	110	114	116	118	121	124	125	127	131
69....	111	115	117	119	122	125	127	129	133
70....	113	117	119	121	124	127	129	131	135
71....	115	119	121	123	126	129	131	133	137

FOR BROAD CHEST

Thoracic Lateral Width, 25.9 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.9	24.1	24.9	25.7	26.6	27.5	28.4	29.2	30.5
58....	106	111	113	115	118	120	123	125	129
59....	107	112	114	116	119	121	124	126	130
60....	108	113	115	117	120	122	125	127	131
61....	109	114	116	118	121	123	126	128	132
62....	110	115	117	119	122	124	127	129	133
63....	112	117	119	121	124	126	129	131	134
64....	113	118	120	122	125	127	130	132	136
65....	114	119	121	123	126	128	131	133	137
66....	115	120	122	124	127	129	132	134	138
67....	116	121	123	125	128	130	133	135	139
68....	117	122	124	126	129	131	134	136	140
69....	118	123	125	127	130	132	135	137	141
70....	120	125	127	129	132	134	137	139	143
71....	121	126	128	130	133	135	138	140	144

GIRLS, AGE 17 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.4 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.6	24.1	25.1	25.8	27.4	29.0	29.7	30.7	32.2
59....	86	91	94	96	101	106	108	111	116
60....	87	92	95	97	102	107	110	113	118
61....	89	94	97	99	104	109	111	114	119
62....	91	96	99	101	106	111	113	116	121
63....	92	97	100	103	108	113	115	118	123
64....	94	99	102	104	109	114	116	119	124
65....	96	101	104	106	111	116	118	121	126
66....	97	102	106	108	113	118	120	123	128
67....	99	104	107	109	114	119	121	125	130
68....	101	106	109	111	116	121	123	126	131
69....	103	108	111	113	118	123	125	128	133
70....	104	109	112	115	119	124	127	130	135
71....	106	111	114	116	121	126	128	131	136

FOR MEDIUM CHEST

Thoracic Lateral Width, 23.5 to 25.3 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.6	24.1	25.1	25.8	27.4	29.0	29.7	30.7	32.2
59....	95	100	103	106	111	116	118	121	126
60....	97	102	105	107	112	117	119	123	128
61....	99	104	107	109	114	119	121	124	129
62....	100	105	109	111	116	121	123	126	131
63....	102	107	110	112	117	122	125	128	133
64....	104	109	112	114	119	124	126	129	134
65....	106	111	114	116	121	126	128	131	136
66....	107	112	115	118	123	127	130	133	138
67....	109	114	117	119	124	129	131	134	139
68....	111	116	119	121	126	131	133	136	141
69....	112	117	120	123	128	133	135	138	143
70....	114	119	122	124	129	134	136	140	145
71....	116	121	124	126	131	136	138	141	146

FOR BROAD CHEST

Thoracic Lateral Width, 25.4 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	22.6	24.1	25.1	25.8	27.4	29.0	29.7	30.7	32.2
59....	108	113	116	119	124	129	131	134	139
60....	110	115	118	120	125	130	132	135	140
61....	112	117	120	122	127	132	134	137	142
62....	113	118	122	124	129	134	136	139	144
63....	115	120	123	125	130	135	138	141	146
64....	117	122	125	127	132	137	139	142	147
65....	119	124	127	129	134	139	141	144	149
66....	120	125	128	131	135	140	143	146	151
67....	122	127	130	132	137	142	144	147	152
68....	124	129	132	134	139	144	146	149	154
69....	125	130	133	136	141	146	148	151	156
70....	127	132	135	137	142	147	149	153	158
71....	129	134	137	139	144	149	151	154	159

WOMEN, AGE 18 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 24.2 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23.0	24.4	25.4	26.1	27.7	29.3	30.0	31.0	32.5
60....	99	104	107	109	114	118	120	123	128
61....	101	106	108	110	115	119	121	124	129
62....	102	107	110	112	116	121	123	126	131
63....	103	108	111	113	118	122	124	127	132
64....	105	110	113	115	119	123	125	128	133
65....	106	111	114	116	120	125	127	130	135
66....	108	113	115	117	122	126	128	131	136
67....	109	114	117	119	123	128	130	132	137
68....	110	115	118	120	124	129	131	134	139
69....	112	117	119	121	126	130	132	135	140
70....	113	118	121	123	127	132	134	136	141
71....	114	119	122	124	129	133	135	138	143

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.3 to 28.7 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23.0	24.4	25.4	26.1	27.7	29.3	30.0	31.0	32.5
60....	106	111	114	116	121	125	127	130	135
61....	108	113	116	117	122	126	128	131	136
62....	109	114	117	119	123	128	130	133	138
63....	110	115	118	120	125	129	131	134	139
64....	112	117	120	122	126	131	132	135	140
65....	113	118	121	123	127	132	134	137	142
66....	115	120	122	124	129	133	135	138	143
67....	116	121	124	126	130	135	137	139	144
68....	117	122	125	127	132	136	138	141	146
69....	119	124	126	128	133	137	139	142	147
70....	120	125	128	130	134	139	141	143	148
71....	121	126	129	131	136	140	142	145	150

FOR BROAD CHEST

Thoracic Lateral Width, 28.8 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	23.0	24.4	25.4	26.1	27.7	29.3	30.0	31.0	32.5
60....	116	121	123	125	130	134	136	139	144
61....	117	122	125	127	131	136	138	140	145
62....	118	123	126	128	133	137	139	142	147
63....	120	125	127	129	134	138	140	143	148
64....	121	126	129	131	135	140	142	145	150
65....	122	127	130	132	137	141	143	146	151
66....	124	129	132	134	138	142	144	147	152
67....	125	130	133	135	139	144	146	149	154
68....	126	131	134	136	141	145	147	150	155
69....	128	133	136	138	142	147	149	151	156
70....	129	134	137	139	143	148	150	153	158
71....	131	136	138	140	145	149	151	154	159

WOMEN, AGE 19–20 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 24.1 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.2	25.5	26.3	27.0	28.3	29.6	30.3	31.1	32.4
60....	101	104	107	109	114	119	121	124	127
61....	103	106	109	111	116	121	123	126	129
62....	105	108	111	113	118	123	125	128	131
63....	106	109	112	114	119	124	126	129	132
64....	108	111	114	116	121	126	128	131	134
65....	110	113	116	118	123	128	130	133	137
66....	112	115	118	120	125	130	132	135	138
67....	113	116	119	121	126	131	133	136	139
68....	114	117	120	122	127	132	134	137	140
69....	116	119	122	124	129	134	136	139	142
70....	117	120	123	125	130	135	137	140	143
71....	119	122	125	127	132	137	139	142	145

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.2 to 27.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.2	25.5	26.3	27.0	28.3	29.6	30.3	31.1	32.4
60....	109	112	115	117	122	127	129	132	135
61....	111	114	117	119	124	129	131	134	137
62....	113	116	119	121	126	131	133	136	139
63....	114	117	120	122	127	132	134	137	140
64....	116	119	122	124	129	134	136	139	142
65....	118	121	124	126	131	136	138	141	144
66....	120	123	126	128	133	139	141	144	147
67....	121	124	127	129	134	140	142	145	148
68....	123	126	129	131	136	141	143	146	149
69....	125	128	131	133	138	143	145	148	151
70....	126	129	132	134	139	144	146	149	152
71....	128	131	134	136	141	146	148	151	154

FOR BROAD CHEST

Thoracic Lateral Width, 27.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.2	25.5	26.3	27.0	28.3	29.6	30.3	31.1	32.4
60....	119	122	125	127	132	137	139	142	145
61....	121	124	127	129	134	139	141	144	147
62....	123	126	129	131	136	141	143	146	149
63....	124	127	130	132	137	142	144	147	150
64....	126	129	132	134	139	144	146	149	152
65....	128	131	134	136	141	146	148	151	154
66....	130	133	136	138	143	148	150	153	156
67....	131	134	137	139	144	149	151	154	157
68....	133	136	139	141	146	151	153	156	159
69....	135	138	141	143	148	153	155	158	161
70....	136	139	142	144	149	154	156	159	162
71....	138	141	144	146	151	156	158	161	164

WOMEN, AGE 21–24 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.6	25.6	26.6	27.6	28.6	29.6	30.6	31.6	32.6
60....	106	109	112	115	118	121	124	127	130
61....	108	111	114	117	120	123	126	129	132
62....	110	113	116	119	122	125	128	131	134
63....	111	114	117	120	123	126	129	132	135
64....	113	116	119	122	125	128	131	134	137
65....	115	118	122	125	128	131	134	137	140
66....	117	120	123	126	129	132	135	138	141
67....	118	121	124	127	130	133	136	139	142
68....	119	122	125	128	131	134	137	140	143
69....	121	124	127	130	133	136	139	142	145
70....	122	125	128	131	134	137	140	143	146
71....	124	127	130	133	136	139	142	145	148

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.0 to 27.2 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.6	25.6	26.6	27.6	28.6	29.6	30.6	31.6	32.6
60....	114	117	120	123	126	129	132	135	138
61....	116	119	122	125	128	131	134	137	140
62....	118	121	124	127	130	133	136	139	142
63....	119	122	125	128	131	134	137	140	143
64....	121	124	127	130	133	136	139	142	145
65....	123	126	129	132	135	138	141	144	147
66....	125	128	131	134	137	140	143	146	149
67....	126	129	132	135	138	141	144	147	150
68....	128	131	134	137	140	143	146	149	152
69....	130	133	136	139	142	145	148	151	154
70....	131	134	137	140	143	146	149	152	155
71....	133	136	139	142	145	148	151	154	157

FOR BROAD CHEST

Thoracic Lateral Width, 27.3 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.6	25.6	26.6	27.6	28.6	29.6	30.6	31.6	32.6
60....	124	127	130	133	136	139	142	145	148
61....	126	129	132	135	138	141	144	147	150
62....	128	131	134	137	140	143	146	149	152
63....	129	132	135	138	141	144	147	150	153
64....	131	134	137	140	143	146	149	152	155
65....	133	136	139	142	145	148	151	154	157
66....	135	138	141	144	147	150	153	156	159
67....	136	139	142	145	148	151	154	157	160
68....	138	141	144	147	150	153	156	159	162
69....	140	143	146	149	152	155	158	161	164
70....	141	144	147	150	153	156	159	162	165
71....	143	146	149	152	155	158	161	164	167

WOMEN, AGE 25–30 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.9	25.9	26.9	27.9	28.9	29.9	30.9	31.9	32.9
60	109	112	115	118	121	124	127	130	133
61	110	113	116	119	122	125	128	131	134
62	111	114	117	120	123	126	129	132	135
63	113	116	119	122	125	128	131	134	137
64	114	117	120	123	126	129	132	135	138
65	115	118	121	124	127	130	133	136	139
66	116	119	122	126	129	132	135	138	141
67	118	121	124	127	130	133	136	139	142
68	119	122	125	128	131	134	137	140	143
69	120	123	126	129	132	135	138	141	144
70	122	125	128	131	134	137	140	143	146
71	123	126	129	132	135	138	141	144	147
72	124	127	130	133	136	139	142	145	148

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.0 to 26.8 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.9	25.9	26.9	27.9	28.9	29.9	30.9	31.9	32.9
60	117	121	124	127	130	133	136	139	142
61	119	122	125	128	131	134	137	140	143
62	120	123	126	129	132	135	138	141	144
63	121	124	127	130	134	137	140	143	146
64	123	126	129	132	135	138	141	144	147
65	124	127	130	133	136	139	142	145	148
66	125	128	131	134	137	140	143	146	149
67	126	130	133	136	138	142	145	148	151
68	128	131	134	137	140	143	146	149	152
69	129	132	135	138	141	144	147	150	153
70	130	133	136	139	143	146	149	152	155
71	132	135	138	141	144	147	150	153	156
72	133	136	139	142	145	148	151	154	159

FOR BROAD CHEST

Thoracic Lateral Width, 26.7 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.9	25.9	26.9	27.9	28.9	29.9	30.9	31.9	32.9
60	126	129	132	135	138	142	145	148	151
61	128	131	134	137	140	143	146	149	152
62	129	132	135	138	141	144	147	150	153
63	130	133	136	139	142	145	148	151	154
64	131	134	138	141	144	147	150	153	156
65	133	136	139	142	145	148	151	154	157
66	134	137	140	143	146	149	152	155	158
67	135	138	141	144	147	151	154	157	160
68	137	140	143	146	149	152	155	158	161
69	139	141	144	147	150	153	156	159	162
70	139	142	145	148	151	154	157	160	163
71	140	143	147	150	153	156	159	162	165
72	142	145	148	151	154	157	160	163	166

WOMEN, AGE 31–40 YEARS

FOR NARROW CHEST

Thoracic Lateral Width, 23.9 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.9	25.9	26.9	27.9	28.9	29.9	30.9	31.9	32.9
60	110	113	116	119	122	125	129	132	136
61	111	114	117	120	123	126	130	133	137
62	112	115	118	121	124	127	131	134	138
63	113	116	119	122	125	128	132	135	139
64	115	118	121	124	127	130	134	137	141
65	116	119	122	125	128	131	135	138	142
66	117	120	123	126	129	132	136	139	143
67	119	122	125	128	131	134	138	141	145
68	120	123	126	129	132	136	140	143	147
69	122	125	128	131	134	137	141	144	148
70	123	126	129	132	135	138	142	145	149
71	124	127	130	133	136	139	143	146	150
72	125	128	131	134	137	140	144	147	151

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.0 to 27.0 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.9	25.9	26.9	27.9	28.9	29.9	30.9	31.9	32.9
60	118	122	125	128	131	134	137	141	145
61	120	124	127	130	133	136	139	143	147
62	121	125	128	131	134	137	140	144	148
63	122	126	129	132	135	138	141	145	149
64	124	128	131	134	137	140	143	147	151
65	125	129	132	135	138	141	144	148	152
66	126	130	133	136	139	142	145	149	153
67	127	131	134	137	140	143	146	150	154
68	129	133	136	139	142	145	148	152	156
69	130	134	137	140	143	146	149	153	157
70	131	135	138	141	144	147	150	154	158
71	133	137	140	143	146	149	152	156	160
72	135	139	142	145	148	151	154	158	162

FOR BROAD CHEST

Thoracic Lateral Width, 27.1 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	24.9	25.9	26.9	27.9	28.9	29.9	30.9	31.9	32.9
60	130	133	136	139	142	145	148	152	156
61	132	135	138	141	144	147	150	154	158
62	133	136	139	142	145	148	151	155	159
63	134	137	140	143	146	149	152	156	160
64	135	138	141	144	147	150	153	157	161
65	137	140	143	146	149	152	155	159	163
66	138	141	144	147	150	153	156	160	164
67	139	142	145	148	151	154	157	161	165
68	141	144	147	150	153	156	159	163	167
69	142	145	148	151	154	157	160	164	168
70	143	146	149	152	155	158	161	165	169
71	145	148	151	154	157	160	163	167	171
72	147	150	153	156	159	162	165	169	173

WOMEN, AGE 41 YEARS AND OVER

FOR NARROW CHEST

Thoracic Lateral Width, 24.4 cm. and below

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.6	26.6	27.6	28.6	29.6	30.6	31.6	32.6	33.6
60	113	114	118	122	126	130	134	138	142
61	114	115	119	123	127	131	135	139	143
62	115	117	121	125	129	133	136	140	144
63	116	118	122	126	130	134	138	142	146
64	117	120	124	128	131	135	139	143	147
65	118	121	125	129	133	137	141	145	149
66	119	123	126	130	134	138	142	146	150
67	120	124	128	132	136	140	144	148	152
68	122	125	129	133	137	141	145	150	154
69	123	127	131	135	139	143	147	152	156
70	124	128	132	136	140	144	148	153	157
71	126	130	134	138	142	146	150	154	158
72	127	131	135	139	143	147	151	155	159

FOR MEDIUM CHEST

Thoracic Lateral Width, 24.5 to 28.1 cm.

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.6	26.6	27.6	28.6	29.6	30.6	31.6	32.6	33.6
60	121	123	127	131	135	139	143	147	151
61	122	125	128	132	136	140	144	148	152
62	123	126	130	134	138	142	146	150	154
63	124	127	131	135	139	143	147	151	155
64	125	129	133	137	141	145	149	153	157
65	126	130	134	138	142	146	150	154	158
66	128	132	136	140	144	148	152	156	159
67	129	133	137	141	145	149	153	157	161
68	131	135	139	143	147	151	154	158	162
69	132	136	140	144	148	152	156	160	164
70	134	138	142	146	149	153	157	161	165
71	135	139	143	147	151	155	159	163	167
72	137	141	145	148	152	156	160	164	168

FOR BROAD CHEST

Thoracic Lateral Width, 28.2 cm. and above

Hgt. in Ins.	WIDTH OF BI-ILIAC DIAMETER IN CENTIMETERS								
	25.6	26.6	27.6	28.6	29.6	30.6	31.6	32.6	33.6
60	135	139	143	147	151	155	159	163	167
61	137	141	145	149	153	157	161	165	168
62	138	142	146	150	154	158	162	166	170
63	140	144	148	152	156	160	163	167	171
64	141	145	149	152	157	161	165	169	173
65	143	147	151	155	158	162	166	170	174
66	144	148	152	156	160	164	168	172	176
67	146	150	154	157	161	165	169	173	177
68	147	151	155	159	163	167	171	175	179
69	149	152	156	160	164	168	172	176	180
70	150	154	158	162	166	170	174	178	182
71	151	155	159	163	167	171	175	179	183
72	153	157	161	165	169	173	177	181	184

CHAPTER EIGHT

MENTAL RETARDATION AND LEARNING DISABILITIES

DEFINITIONS

Mental retardation. The American Association on Mental Deficiency (AAMD) defines mental retardation as follows: "Mental retardation refers to subaverage general intellectual functioning which originates during the developmental period and is associated with impairment in adaptive behavior."[1]

Learning disabilities. The learning disabled child is one who is "usually extremely deficient in academic achievement due to a limited intellectual capacity, or brain damage caused by disease or injury."[2]

BEHAVIOR OBJECTIVES

1. The student attains a minimum Physical Fitness Index score of 40 on the Township of Ocean Physical Fitness Test Battery (with no single component stanine score of less than 3), or a score which is satisfactory in terms of his somatotype (grades Kindergarten-12).
   Student performance is assessed by the teacher.
2. The student attains a minimum Motor Ability Index score of 40, or a single component score of 3 on the Township of Ocean Motor Ability Test Battery (grades Kindergarten-12).
   Student performance is assessed by the teacher.
3. The student displays an increased positive self-concept (ten percent gain) based on pre- and post-administration of the Self-Concept Pictorial Scale[3] (grades Kindergarten-4).
   Student performance is assessed by the teacher.
4. The student demonstrates the ability to integrate the following perceptual-motor responses: auditory-motor; visuo-motor; and audio-visuo-motor (grades Kindergarten-12). In each situation the *child* must make a correct decision.
   Evaluative criteria: perceptual-motor materials distributed in class.
   Student performance is assessed by the teacher.
5. The student demonstrates proficiency in two new recreational activities, (grades Kindergarten-12).
   Evaluative criteria: pre- and post-test inventory of recreational pursuits.
   Student performance is assessed by the teacher.
6. The student demonstrates increased ability to order tasks sequentially.
   Evaluative criteria: pre- and post-test of tasks that require serial ordering.
   Student achievement is assessed by the teacher.
7. The student manifests an increased "attention-span," (grades Kindergarten-12).
   Evaluative criteria: pre- and post-time test working on a pegboard design.
   Student performance is assessed by the teacher.

TEST

Administration of the physical fitness and motor ability tests.

Administer both test batteries as per instructions in Chapters 4 and 5.

Note: Prior to admission to the D&A Program, the student with mental retardation or a learning disability must have a medical excuse form signed by the family or school physician, the Child Study Team[4] or the school psychologist if there is no "Team." Further, the "Team" should provide the prescriptive tasks, or approve of the D&A teacher's recommended prescription.

[1] Jean M. Moran and Leonard H. Kalakian, *Movement Experiences for the Mentally Retarded or Emotionally Disturbed Child* p. 7.

[2] Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child* p. 92.

[3] Angelo S. Bolea, Donald W. Felker and Margaret D. Barnes, "A Pictorial Self-Concept Scale for Children in K-4, pp. 223-224.

[4] The Child Study Team, consisting of a psychologist, social worker, learning disability specialist, nurse, physician and coordinator, legally "classify" children with learning disabilities in the State of New Jersey.

Administration of self-concept test.

Administer test battery as per instructions provided in Appendix 11.

Auditory response test.

The teacher has the subject listen intently to one sound, without looking. Examples might be a loud sound on a tamborine or drum, or a shrill blast of a whistle. The teacher then follows with three sounds and asks the child to identify the sound originally heard. For example, the initial sound might be a loud "thud" on the tamborine; the sounds that follow might be striking the tamborine on the wooden structure, lightly on the surface, and with a loud "thud" on the surface.

Audio-motor response test.

The same test directions explained above pertain, but the subject is requested to "jump," "hop," "skip," etc., *only* when he identifies the correct sound. For example, the child might be requested to "jump" every time he hears the loud "thud."

Visual response test

The teacher assumes a specific body position and three children assume varying positions of the same pattern, one of which is correct. The subject being tested, is asked to identify the one pattern that is identical to the teacher's position. (Refer to Figure 8-1 for illustration.

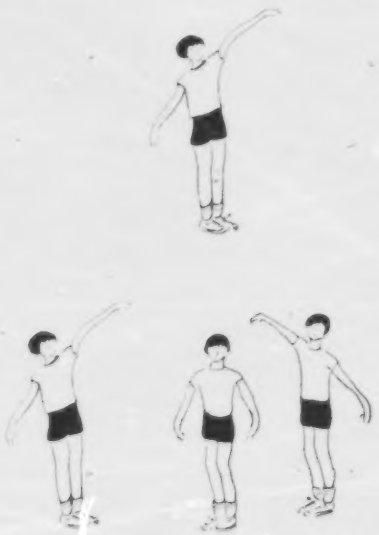

Fig. 8-1 Visual Response Test

Visuo-motor response test

The teacher assumes a specific body position; the subject is requested to replicate the same position.

Audio-visuo-motor response test

The teacher demonstrates two sounds and requests that the student perform a specific motor response for each sound. (Refer to Figure 8-2 for illustration.) The test presupposes the child's ability to perform all perceptual motor tests cited.

Fig. 8-2 Audio-Visuo-Motor Response Test

Note: Responses tested are applicable only in a physical activity setting.

Serial ordering test

The instructor demonstrates and explains the serial-ordering game by verbalizing several letters and hopping, jumping, etc., into the proper squares sequentially. The subject is then given a task, involving the sequencing of four letters, to perform (e.g., hop on the following four letters, in order, "A," "Q," "S," and "H"). The subject is to perform the same task twice. If he does not sequence the four items, he is to repeat the same task. In the event he does perform all items correctly, the task is to be increased to the sequencing of five letters, or to the number at which he cannot perform the entire test satisfactorily.

A	G	J	N	R	T	V	Y
Q	S	U	O	B	D	P	I
E	W	X	Z	H	E	C	O
R	B	N	T	A	U	Y	E
A	E	I	O	U	G	F	S
D	P	Q	K	L	B	R	U
T	N	O	B	C	Q	L	M
J	H	S	D	A	T	E	D

Figure. 8-3 Serial Ordering Test

Note: If the child cannot identify letters and perform the motor task, vary the test to include a symbol recognition and motor task he can perform (e.g. numbers and jumping, or geometric forms and walking).

Attempts: *2 or more* Scoring: *Longest sequence of two or more attempts.*

Student learning experience: have one student verbalize a sequence of tasks for the partner to replicate; the verbalizer to provide feedback regarding performance.

ASSESSMENT

Physical fitness, motor ability and self-concept.

Assess performance as per instructions in Chapters 4 and 5. Record scores on Individual Prescription Card.

Auditory or auditory-motor responses

If the child cannot perform auditory tasks correctly, the problem may be one of auditory response. On the other hand, if the auditory response is correct but the child cannot replicate the audio-motor response correctly the problem may relate to the integration of the auditory and motor responses. Record remarks accordingly on Individual Prescription Card.

Visual or visuo-motor responses

Interpret performance as per the auditory test and record remarks on the Individual Prescription Card.

Fig. 8-4
Visuo-Motor Task

Audio-visuo-motor responses

Inability to replicate properly may be indicative of an inability to integrate all responses. Record remarks on Individual Prescription Card.

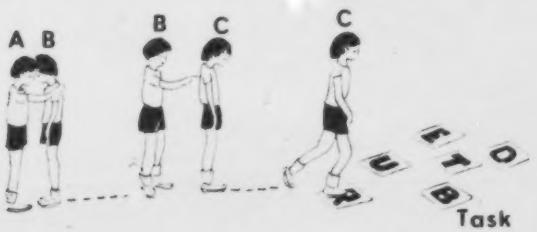

Fig. 8-5

[1]Thomas M. Vodola, Chapter 7, "Physical Education for the Handicapped: A Neglected Approach," in *Handbook on Learning Disabilities*, ed., Robert E. Weber, NJACLD, pp. 131-153.

Serial ordering

Record the number of tasks ordered on Prescription Card.

Note: The ability to order sequentially an increasing number of tasks is related to the child's attention span;—thus the information will aid in devising prescription activities.

Psychological aberrations.

During all phases of testing, the teacher should keep a record of the specific behavior pattern manifested by each child. Although children with mental retardation or learning disabilities do not reveal the same problems, they generally display one or more of the following patterns:[1]

1. hyperactivity—the constant manifestation of excessive motor activity
2. perseveration—the inability to cease performing the same act repeatedly
3. distractibility—the limited ability to concentrate on the task at hand because of external distractions
4. dissociation—the inability to integrate basic data into "meaningful wholes"

PRESCRIPTION

Physical fitness and motor ability

Prescribe tasks as recommended in Chapters 4 and 5.

Self-concept

Enhance the child's self-concept by providing tasks and activities that stress the following:

1. sequentualized learning, from the simple to the complex, to insure success at each level
2. immediate, positive reinforcement when desired outcomes are achieved (e.g., allow the child to perform an activity he likes after he achieves the requested goal)
3. gentle firmness to insure that the child overcomes an unwarranted fear of performing a task within his ability level (particularly in the case of the child who tends to "perseverate").
4. student recording of own scores, where possible, to aid in the reinforcement process
5. structuring the second half of the instructional period so that it focuses on the physical activity interests of the child (to be ascertained by teacher-pupil informal discussion)
6. *personalized* instruction that constantly makes the child aware of his importance as an individual

Perceptual-motor response problems

Prescribe a variety of tasks that focus on the child's ability to discriminate between auditory and visual tasks. Structure the learning experiences so that the tasks involve a minimal motor response.

Perceptual-motor integration-response problems.

The inability to perform a task may not necessarily be caused by a motor problem; the problem may be attributable to the child's inability to "match" the perceptual information with the proper motor response. In fact, since motor patterns occur as a result of innervation of muscles and muscle groups, stress should be focused on tasks and activities that emphasize the *process* of the task rather than the *product*. For example, if a child cannot perform the task of hitting a moving whiffleball, he should not be required to continue at that task. His problem may be due to an inability to integrate the perceptual experiences necessary to develop the proper outgoing neural responses. The prescriptive recommendation would be to provide a variety of visuo-motor responses such as:

1. striking a stationary ball with the hand
2. catching the ball as it moves through a variety of planes
3. striking a stationary ball with a bat or with his extended hand
4. striking a ball as it moves through a variety of planes

Many times the integration of simultaneous perceptual information is distorted as it is converted to the motor act. Thus, the general rule to remember when prescribing for integrative response problems is to PROVIDE THE CHILD WITH A VARIETY OF SEQUENTIALLY STRUCTURED, CONCRETE MOTOR EXPERIENCES THAT ARE DISTINCT PARTS OF THE TOTAL TASK REQUIRED.

Student learning experience: have children work with partners, where possible. In the example above, they can pass the suspended ball back and forth.

Serial ordering

Prescribe a variety of tasks, activities and games that require the child to internalize a specific sequence. As specific goals are attained, increase the complexity of the directions. Prescribe some tasks that fit the pattern of daily living. For example, you might request that a student pick up a piece of paper, throw it in the waste basket, close the door, and sit down (in that order).

Note: The ability to serially order requested tasks can enhance a child's auditory perception, attention span, ability to follow directions, and can contribute to the development of spelling and reading skills.

Student learning experience: have the children devise sequences for their partners, monitor and give feedback regarding responses.

Psychological aberrations

Suggested activities and teaching cues:[1]

1. hyperactivity–
   a. Perform relaxation exercises daily. Exercises should include tensing and then gradually relaxing the major muscle groups of the body. These exercises should be explained in class.
   b. Perform regular motor activities that stress decelerating neural impulses. For example, have students run as fast as they can, three-quarter speed, half-speed, and as slowly as they can.
2. perseveration–
   a. Have the child practice those skills that will improve his deficiencies.
   b. Vary the tasks and activities when working with children who manifest a tendency to perseverate. In order to overcome student reticence to perform, the parent or teacher must be gentle, patient, and yet forceful. Once the child has been assisted through the movement, he will develop confidence and start to perseverate again–thus the need for constant variation.
3. distractibility–
   a. Structure the teaching environment to minimize distracting stimuli.
   b. Have the group work on one task to successful completion before moving on to the next task.
   c. Increase the difficulty of a task as soon as success is achieved.
   d. Perform relaxation exercises.
4. dissociation–
   a. Stress the "whole," "part," "whole" method of teaching. Start by having the child see the total pattern of performance desired, then break the task down into its component parts, and finally, constantly demonstrate the "whole."
   b. Use pegboards to develop "closure" perceptual-motor skills. Have the child view an incomplete pegboard pattern and attempt to reproduce the completed pattern on a second board. (See Figure 8-6)

Note: Pegboard activities are to be prescribed by the learning disability specialist.

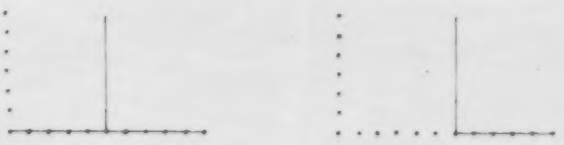

Fig. 8-6 Pegboard Closure Activity

(Courtesy of New Jersey Association for Children with Learning Disabilities.)

Motor-cognitive and academic achievement (MCAA)

Recent research efforts indicate that proper structuring of physical education activities can enhance a child's cog-

[1] *Ibid.*

nitive abilities and academic achievement. Design tasks, activities and games so that the child:[1]

1. has two, or more "information systems" (auditory, visual, etc.) impinging upon him, one of which is motor (perceptual-motor).
2. is involved in the decision-making process (cognition).
3. is required to make a decision that is *directly related* to academic achievement (transfer of learning).

An illustrative example will help to clarify the MCAA approach:

1. a child is prescribed beanbag tossing through an opening in a target to enhance his eye and hand accuracy. The task involves a visuo-motor response.
2. a child is prescribed beanbag tossing at a target that has several openings, with letters recorded above each aperture. (See Figure 8-7.)

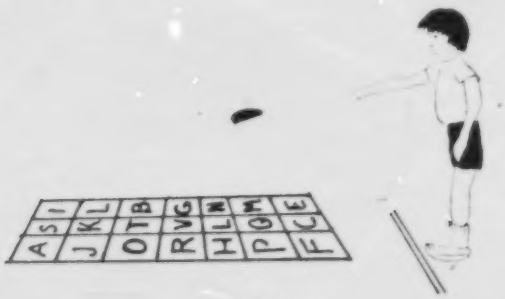

Fig. 8-7
Motor-Cognitive-Academic Achievement Target

The child attempts to identify letters, or spell words by throwing beanbags through the appropriate openings. The task involves: a visuo-motor response; cognition (knowledge level); and academic achievement (learning letters of the alphabet and spelling words)

The MCAA approach has important implications for teaching children who are mentally retarded or learning disabled. The research to date reveals that this approach produces the greatest academic gain for this population. The teacher should devise and prescribe MCAA tasks, wherever possible.

Note: Use of MCAA method presupposes the child has developed competency in the motor task.

Student learning experience: have one student verbalize a word and the partner attempt to spell the word by tossing beanbags through the correct openings—the verbalizer to provide feedback.

EVALUATION

Readminister the Township of Ocean Physical Fitness Test, Motor Ability Test and Form B of Self-Concept Scale (nine-week intervals). Record student achievement on Behavior Performance Chart (Appendix 13) as follows: physical fitness—pre- and post-test PFI scores; self-concept—pre- and post-test raw scores; and criterion-referenced norms—pass or fail.

Apprise the medical authorities and the Child Study Team of the student's progress. As soon as educationally sound, the mentally retarded or learning disabled child should be integrated with his peer group, on either a part-time or full-time basis.

STUDENT LEARNING EXPERIENCES

1. *Verbalize a Series of Tasks For a Partner to Replicate, Grades 1-6.*

   Teacher's Role. a. Set up activities and game situations based on serial ordering (i.e., where students must perform a series of tasks in sequential order). b. Explain and demonstrate the game; pair students with one calling out the sequence and the other performing the tasks in sequence. c. Stimulate other types of games including the same concept.

   Student's Role. a. Participate as the verbalizer and as the performer. When serving as the verbalizer, he is to note the sequence of performance and provide the proper feedback. B. Devise and implement similar games that incorporate the identification and spelling concept.

   Values: Math, spelling and reading readiness skills, increased attention-span.

2. *Participate in Tasks Designed to Enhance Perceptual-Motor Responses, Grades Kindergarten-6.*

   Teacher's Role. a. Design and implement tasks that focus on perceptual tasks. b. Design and implement tasks that focus on motor tasks. c. Design and implement tasks that focus on the integration of perceptual-motor responses. d. Individualize student prescriptions based on the results of "a" and "b" above.

   Student's Role. a. Perform "perceptual," "motor," and "perceptual-motor" tasks.

   Values: Perceptualization, motor performance, integration of perceptual and motor responses.

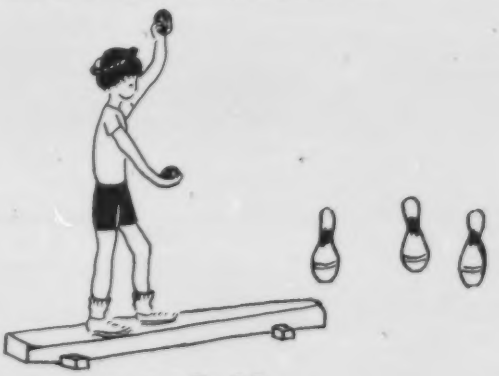

Fig. 8-8
Perceptual-Motor Task

[1]Numbers one and two are paraphrased from an address by G.N. German, O.D., "Perceptual-Motor Programming," E.D.A.

3. *Participate in Relaxation-Type Activities, Grades Kindergarten-12, The Hyperactive Student.*

   Teacher's Role. a. Explain and demonstrate relaxation exercises. b. Devise and implement games that decrease neural impulses that impinge on the individual. c. Explain the concept and tasks to parents so that they can implement them at home.

   Student's Role. a. Perform the relaxation exercises for ten minutes each day. b Concentrate on noting the different degrees of tension involved in deceleration games so that he can internalize the ability to relax.

   Values: Ability to relax various muscle groups, concentrate on the task at hand, and perform tasks more efficiently and effectively.

4. *Participate in Tasks Designed to Increase Attention-Span, Grades Kindergarten-12, The Distractible Student.*

   Teacher's Role. a. Explain and demonstrate tasks that increase attention-span (i.e., tasks designed to maintain student concentration for increasing periods of time). b. Devise and implement games that increase student concentration. (Refer to Student Learning Experience number one for an example.) c. Provide positive feedback to enhance increased attention-span.

   Student's Role. a. Perform the tasks and games as directed. b. Strive to increase his time duration in performing a specific task or game.

   Values: Ability to concentrate for increasing periods of time, and to perform tasks more efficiently and effectively.

5. *Participate in Motor-Cognitive and Academic Achievement (MCAA) Tasks, Grades Kindergarten-6.*

   Teacher's Role. a. Design and implement MCAA tasks and games that involve: (1) Two or more sensory inputs. (2) A motor response. (3) A decision by the student. (4) Transfer of learning to a specific academic skill.

   Student's Role. a. Participate in the tasks and games. b. Observe partner or classmate's performance and assist when needed. c. Attempt to devise and implement new MCAA experiences.

   Values: Enhancing decision-making and academic achievement.

Note: All of the above experiences will enhance the child's self-concept if tasks and activities are structured to insure success supported by immediate, positive reinforcement.

CHAPTER NINE

BREATHING PROBLEMS

DEFINITION

A breathing problem is defined as a respiratory problem which results in an individual's limited ability to expel air.

BEHAVIORAL OBJECTIVES

1. The student demonstrates a twenty percent improvement in his vital capacity score (grades Kindergarten-12).
   Evaluative criteria: pre- and post-test wet or dry spirometer or "hissing" test. Student performance is assessed by the teacher in grades Kindergarten-6 and by the partner in grades 7-12.
2. The student manifests a positive self-concept, or attitude toward physical activity (grades Kindergarten-12).
   Evaluative criteria: pre- and post self-concept test,[1] grades Kindergarten-4; pre- and post Wear Attitude Inventory,[2] grades 5-12 (ten percent gain in raw score). Student performance is assessed by the teacher.
3. The student demonstrates an awareness of his exercising and activity tolerance limits (grades 7-12).
   Evaluative criteria: post-test vital capacity score decrease—exercises and activities remain the same; post-test vital capacity score remains the same as the pre-test or increases—exercises and activities are increased. Student performance is assessed by his partner.

Note: Student involvement in the program is predicated on the basis of physician and parental approval of all activities.

[1]Angelo S. Bolea, Donald W. Felker and Margaret D. Barnes, "A Pictorial Self-Concept Scale for Children in K-4," pp. 223-224.

[2]C.L. Wear, "Construction of Equivalent Forms of an Attitude Scale." pp. 113-119.

[3]Ron Adams, Director, "A Physical Conditioning Exercise Program for the Asthamtic Patient."

TEST

Administration of breathing test.[3]

1. Patient must assume standing position, flexed at waist.
2. Resting vital capacity (VC) is taken. Patient is allowed three trials and the best score is tabulated on the VC curve chart (refer to Figure 9-1). Alternate method of determining vital capacity: Subject holds his nostrils closed and expirates through pursed lips, slowly and steadily. Vital capacity score to be recorded is the number of seconds required to expel all air (use a stopwatch).
3. Execution of six listed exercises. No rest period allowed between exercises. (refer to Figure 9-2).
4. Patient returns to the standing position.
5. Vital capacity is recorded form the wet or dry spirometer reading. Patient is allowed three trials and the best score is tabulated on the VC curve chart.
6. Curve chart is drawn for VC progress by connecting weekly dots. A ruler is used to plot the VC progress by connecting weekly dots.
7. The date of the expiration test should be recorded below each respective week.

Note: Students with breathing problems are not to be admitted to the program unless medical or parental approval is received.

Equipment needed: Wet, or dry spirometer; book, twelve inches thick for toe stand, inhale-exhale exercise; and a ruler.

Administration of self-concept test.

Administer test batteries as per instructions in Appendix 11 and 12.

NAME _____ AGE _____

SCHOOL _____ GRADE _____

	Test Date	Pre-Test VC	Post-Test VC	Exercise Circuits
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

Fig. 9-1 Vital Capacity Curve Chart

(Courtesy of Ron Adams, University of Virginia Hospital, Charlottesville, Va.)

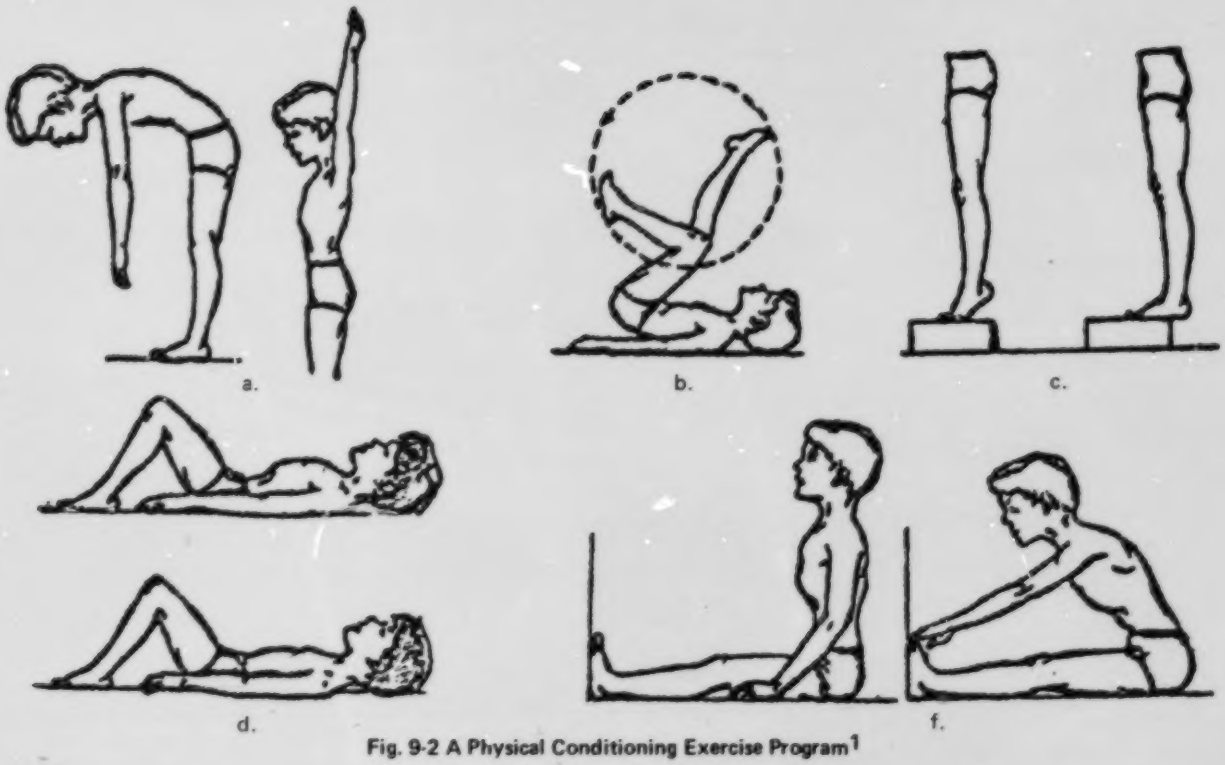

Fig. 9-2 A Physical Conditioning Exercise Program[1]

A Physical Conditioning Exercise Program for the Asthmatic Patient. (a) Standing breathing with arm swing. Child is standing, leans forward, arms dangling. He stretches arms overhead, rising to erect position on the toes, breathing in. Then he drops forward, breathing out through his mouth, making a hissing sound. Relax. Repeat twenty times. (b) Bicycle exercise. The child lies on his back and makes a circular motion with his legs as if peddling a bicycle. Continue for thirty seconds. (c) Toe stand inhale-exhale. (left) The child stands on his toes, using a book for foot support, and inhales. (right) The child exhales and relaxes by placing the heels of his feet on the floor. Repeat twenty times. (d) Chest breathing, supine position. (top) The child breathes in through his nose, expanding his abdomen, then his chest. (bottom) He breathes out through his mouth, making a hissing sound as he lowers the abdomen, then the chest. Repeat twenty times. (e) Running in place exercise (not shown). The child raises and lowers his feet far enough to clear the floor. He then counts to fifty, the number of right contact only. (f) Sitting toe touch. (left) The child sits on the floor, feet against the wall, knees stiff; he inhales. (right) He touches his toes with his fingertips. Exhale, Repeat fifteen times.

[1]Ron Adams, Director, "A Physical Conditioning Exercise Program for the Asthmatic Patient." Permission to publish granted.

ASSESSMENT

Objective appraisal.

Note the pre- and post-test differences in vital capacity scores as a result of the intervening exercise routine. Record and plot weekly scores on Figure 9-1.

Subjective appraisal.

Observe student performance of exercising routine to detect any peculiarities such as inability to perform an exercise, labored breathing, etc. Meet with the school nurse, parent and particularly the student to gain some insight into the problem. Record vital information in the student's D&A folder, such as medication taken, dosage and time interval. Note whether subject is more distressed during changes in climate and periods of varying degrees of excitement.

Student learning experience: students working in pairs, testing vital capacity scores via the spirometer and "hissing" test. Maintain records of percentage gain in vital capacity, or expiration time.

PRESCRIPTION

Exercising routines.

Prescribe exercises only after careful objective and subjective appraisal. Have the subject perform one "circuit" of the exercises illustrated in Figure 9-2. If the post-test vital capacity score remains the same as, or exceeds the pre-test score, increase to two the number of circuits to be

performed for the next meeting.

Similarly, the teacher can devise a circuit of exercises from the deep breathing exercises recommended by Adams, Daniel and Rullman[1]:

EXERCISES FOR DEEP BREATHING

A. 1. supine position.
2. hips and knees flexed.
3. feet flat on floor.
4. inhale through nose to maximum.
5. hold briefly.
6. exhale through mouth with hissing sound.
7. Repeat

B. 1. supine position.
2. hips and knees flexed
3. feet flat on floor.
4. place one hand on upper chest.
5. place other hand on abdomen.
6. inhale through nose and try to elevate the chest only.
7. hold briefly.
8. exhale through mouth with hissing sound.
9. abdomen should remain fairly still during exercise.
10. Repeat

C. 1. supine position.
2. hips and knees flexed.
3. feet flat on floor.
4. place one hand on each side of ribs.
5. inhale through nose, try to elevate chest only.
6. hold briefly.
7. exhale through mouth with hissing sound.
8. push hands together during expiration.
9. abdomen should remain fairly still during exercise.
10. repeat.

D. 1. supine position.
2. hips and knees flexed.
3. feet flat on floor.
4. place folded towel around chest.
5. cross arms across chest.
6. grasp ends of towel.
7. inhale through nose, try to elevate chest only.
8. hold briefly.
9. exhale through mouth with hissing sound.
10. pull towel tight during expiration.
11. repeat.

E. 1. sit in chair.
2. arms relaxed at sides.
3. slowly flex at waist.
4. exhale through mouth, as you flex body toward floor.
5. hold briefly at maximum position.
6. slowly sit up.
7. inhale through nose.
8. hold at sitting position
9. repeat.

Also have the subject participate in modified games and activities. Modify the experiences in accordance with the tolerance level of the individual. Structure all activities to incorporate the "overload principle"—tasks that are increasingly demanding.

Note: To avoid overfatigue, or the onset of a "breathing attack," be sure that all prescriptions are approved by the subject. Inform the student that he is to stop at any time when he feels the activity is too demanding.

Student learning experience: (a) have the students design their own circuit of exercises (that includes deep breathing), and keep a record of their progress in terms of vital capacity scores; (2) have the students determine and interpret their percentile scores. (Refer to Table 9-1 for norms.)

[1]Ronald C. Adams, Alfred N. Daniel and Lee Rullman, *Games, Sports and Exercises for the Physically Handicapped*, pp. 229-230. Permission to publish granted.

TABLE 9-1
VITAL CAPACITY TEST NORMS

FACTOR: Vital Capacity
TEST ITEM: Dry Spirometer

GIRLS

n=	57	52	51	52	62	63		60	46	66	71	124	61
Age	6	7	8	9	10	11		12	13	14	15	16	17
							Percentile						
	2000	2500	2000	2500	2800	3600	99	3000	4000	4100	4600	4400	5800
	1900	2500	2000	2500	2800	3300	96	3000	3700	4000	4300	4300	4500
	1700	2000	1800	2300	2700	3000	90	2800	3600	3900	3800	4000	4000
	1500	1700	1600	2100	2600	2800	80	2700	3400	3500	3700	3700	3900
	1500	1600	1600	2000	2500	2700	75	2500	3400	3500	3600	3600	3800
	1500	1600	1600	1800	2500	2700	70	2500	3200	3500	3500	3500	3800
	1400	1500	1500	1800	2500	2600	65	2500	3200	3300	3500	3500	3600
	1400	1500	1500	1700	2400	2500	60	2400	3100	3200	3500	3400	3500
	1300	1400	1400	1700	2300	2400	50	2300	3000	3000	3200	3200	3500
	1100	1400	1300	1600	2200	2300	40	2200	2700	2900	3000	3200	3400
	1100	1300	1300	1600	2100	2200	35	2100	2700	2900	3000	3100	3300
	1000	1300	1300	1500	2000	2200	30	2000	2700	2700	2900	3000	3200
	1000	1300	1300	1500	2000	2200	25	2000	2600	2600	2600	3000	3200
	1000	1200	1200	1400	1800	2000	20	1900	2500	2500	2500	3000	3200
	900	1000	1100	1200	1600	1900	10	1700	2300	2400	2400	2700	3000
	700	900	1000	1200	1500	1700	4	1600	2300	2200	2000	2400	3000
	600	900	1000	1000	1200	1600	1	1600	2100	2100	1800	2300	2700

MEASURED IN CUBIC CENTIMETERS

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(Courtesy of the Township of Ocean School District)

TABLE 9-1 (Continued)

VITAL CAPACITY TEST NORMS

FACTOR: Vital Capacity
TEST ITEM: Dry Spirometer

BOYS

n=	45	45	52	63	51	58		51	50	50	50	50	50
Age	6	7	8	9	10	11	Percentile	12	13	14	15	16	17
	2300	2400	2400	3700	3400	3600	99	3200	4800	4500	5900	5600	6100
	2200	2100	2400	3000	3300	3600	96	3200	4300	4100	5500	5000	5800
	2000	2100	2200	2800	3200	3400	90	3000	3600	3900	5100	4900	5500
	1700	1900	2100	2500	2900	3200	80	2800	3300	3600	5000	4700	5200
	1500	1800	2000	2400	2800	3200	75	2700	3200	3500	4600	4700	5200
	1500	1800	2000	2300	2800	3100	70	2700	3000	3500	4600	4600	5000
	1500	1700	2000	2200	2700	3000	65	2600	3000	3500	4500	4500	5000
	1400	1700	1900	2200	2700	3000	60	2600	3000	3400	4500	4400	4800
	1300	1700	1700	2100	2600	2800	50	2500	2800	3300	4400	4400	4600
	1200	1600	1600	2000	2500	2700	40	2300	2700	3200	4000	4200	4500
	1200	1600	1500	2000	2500	2600	35	2300	2600	3100	3900	4000	4400
	1100	1600	1500	1800	2400	2600	30	2200	2500	3000	3800	3900	4400
	1100	1500	1500	1800	2200	2500	25	2200	2500	3000	3700	3800	4200
	1000	1500	1400	1800	2200	2400	20	2000	2500	2800	3600	3700	3900
	900	1300	1300	1600	2100	2200	10	1900	2300	2500	3200	3500	3400
	900	1200	1200	1500	1800	2000	4	1700	1900	2500	3000	3300	3200
	900	1100	1000	1200	1800	1700	1	1700	1900	2300	3000	3000	3000

MEASURED IN CUBIC CENTIMETERS

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(Courtesy of the Township of Ocean School District)

EVALUATION

Readminister the Self-Concept and Attitude Inventory at nine-week intervals. Record student achievement on Behavioral Performance Chart (Appendix 13) as follows: breathing test—vital capacity scores administered during the first and last week, plus breathing gains or losses; self-concept and attitude—pre- and post-test raw scores; and criterion-referenced norms—pass or fail.

Apprise the medical authorities of the student's progress in terms of VC gain and psychological adjustment to physical activity. If reasonable progress is made, recommend the child be streamed into the unrestricted physical education program during the less demanding leisure time activities.

STUDENT LEARNING EXPERIENCES

1. *Measure Vital Capacity, Grades 7-12.*

   Teacher's Role. a. Explain the relationship of vital capacity to one's well-being. b. Explain and demonstrate the use of the dry spirometer and the "hissing" methods of measuring vital capacity.

   Dry Spirometer Method

   (1) Student to expirate through mouthpiece, keeping nostrils closed and lips pursed so that no air escapes around the mouthpiece.

   (2) Student to expirate slowly, and conclude by bending at the waist.

   (3) After three trials are taken, the best vital capacity score is recorded.

   "Hissing" Method

   (1) Same procedure as above except the air is expirated through pursed lips.

   (2) A stopwatch is used to measure expiration times; the longest time period of three attempts is recorded.

   c. Pair students for testing purposes. d. Distribute expiration test scoring sheets. (Refer to Figure 9-1 on page 158 for a sample form.) e. Assist students to insure accurate testing and scoring.

   Student's Role. a. Measure his own vital capacity, if the dry spirometer is used; or time his partner if the hissing method is used. b. Record his best score.

2. *Determine Personal Tolerance Limits and Improvements, Grades 7-12.*

   Teacher's Role. a. Explain and demonstrate diaphragmatic breathing exercises. B. Assist students to ensure deep breathing. c. Have students retake their vital capacity upon completion of the exercises. d. Demonstrate procedure for ascertaining improvement.

   Student's Role. a. Perform the exercising regimen. b. Remeasure vital capacity after exercising. c. Determine his improvement (pre-test score—post-test score).

3. *Plan and Implement an Individualized Program, Grades 9-12.*

   Teacher's Role. a. Explain procedure for increasing the stress of aerobic-type activities. b. Post and explain a variety of activities that involve diaphragmatic breathing. c. Structure the class period so that each student can perform his exercises. d. Observe each student to ensure that he does not exceed his tolerance limits. e. Be sure each student's medical approval form is on file.

   Student's Role. a. Keep a daily log of vital capacity scores. b. Continue to perform one "circuit" of the exercises as long as his post-test scores are *less than* his pre-test scores. c. Increase his circuits by one whenever his post-test scores are *equal to or greater* than his pre-test scores. d. Use common sense when performing exercises. For example, if he does not feel well, or is bothered by climatic conditions, he should restrict his program accordingly. e. Participate in other endurance-type activities after school and on weekends. f. Keep an anecdotal record of other pertinent information such as dates and severity of "attacks," increase or decrease in medical dosage, etc.

CHAPTER TEN

MOTOR DISABILITIES OR LIMITATIONS

DEFINITION

A motor disability or limitation is defined as a temporary or permanent handicap which impedes the individual's ability to function motorically. Included in this category would be orthopedic problems, congenital deformities, multiple sclerosis, muscular dystrophy as well as post-operative and convalescent patients.

BEHAVIORAL OBJECTIVES

1. The student demonstrates an improvement in physical fitness and motor ability (Kindergarten-12).
   Evaluative criteria: ten percent improvement in those test items he can perform. Student performance is assessed by the teacher.

2. The student, with disuse atrophied muscles, shows an increase in muscle girth measurements (grades Kindergarten-12).
   Evaluative criteria: pre- and post-test muscle girth measurements; results to indicate a minimum of a five percent increase beyond the initial girth measurement, Kindergarten-12). Student performance is assessed by the teacher in grades Kindergarten-6 and by the partner in grades 7-12.

3. The student, with disuse atrophied muscles, shows an increase in muscular strength (grades Kindergarten-12).
   Evaluative criteria: pre- and post-test muscular strength measurements; results to indicate a minimum of a five percent increase beyond the initial strength measurement. Student performance is assessed by the teacher in grades Kindergarten-6 and by the partner in grades 7-12.

4. The student, with a range of motion limitation, shows an increase in flexibility (grades Kindergarten-12).
   Evaluative criteria: a minimum of a five percent increase in the range of motion as measured by a goniometer, or a flexometer. Student performance is assessed by the teacher in grades Kindergarten-8 and by the partner in grades 9-12).

5. The student demonstrates the ability to determine his muscle girth measurement, Strength Decrement Index, and range of motion, grades 9-12 (where applicable).
   Evaluative criteria: material in student handbook. Student performance is assessed by the teacher.

6. The student manifests a positive self-concept, or attitude toward physical activity (grades Kindergarten-12).
   Evaluative criteria: pre- and post self-concept test, grades Kindergarten-4; pre- and post Wear Attitude Inventory, grades 5-12 (ten percent gain in raw score). Student performance is assessed by the teacher.

7. The student, who utilizes crutches, demonstrates proficiency in locomotive skills (grades Kindergarten-12).
   Evaluative criteria: the ability to ambulate by any of the acceptable "gaits" (e.g., walking and climbing and descending stairs). Student performance is assessed by the teacher.

8. The student displays joy in participating in physical activity modified according to his needs (grades Kindergarten-12).
   Evaluative criteria: repeated student participation in the activities during class time or after school and evidence of personal satisfaction. Student performance is assessed by the teacher.

Note: Student participation in the program is predicated on the basis of physician or parental approval of all activities.

TEST

Physical fitness and motor ability.

Performance of as many test items as possible (while

cognizant of the safety factor).

Muscle girth, SDI, range of motion

Test as follows:

1. Muscle girth is determined with a measuring tape. The "contracted" muscle is measured three times; record the most representative measurement. Be sure to apply the tape at right angles to the length of the muscle, at the point of greatest circumference (select permanent landmark and record for accuracy of test–retest).
2. The SDI is administered at the beginning and end of a period to determine a student's tolerance to the intervening exercising program (e.g., test the strength of the quadriceps muscles before and after an "iron boot" exercise).

   Formula: $SDI = \frac{Sb\text{-}Sa}{sb} \times 100$ Symbols:
   Sb-Strength before
   Sa- Strength after
3. Range of motion is measured at nine-week intervals by use of the goniometer,[1] or the Leighton flexometer.[2]

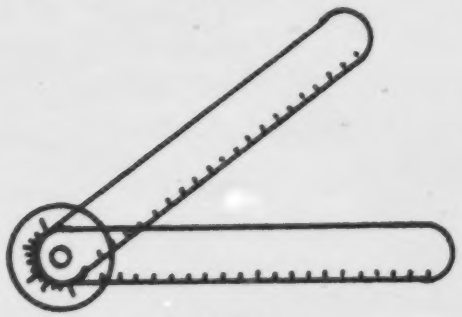


Fig. 10-1 Goniometer

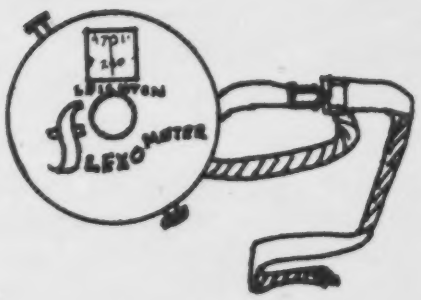


Fig. 10-2 Flexometer

The international standard goniometer consists of two plastic arms hinged together. It is used by placing the axis of the instrument as close as possible to the functional axis of the body; placing the "fixed arm" in line with the stabilized part of the body; and following the motion of the body part that is to be measured by the movable arm. The Leighton flexometer is another instrument for measuring range of motion. The device is used by strapping it to the moving part being tested, locking a circular disc in place at that point, and then locking a pointer in place after the range of motion has been completed. Thus, the pointer will indicate the amount of joint flexibility.[3]

Student learning experience: working in pairs measuring muscle girth, SDI, and range of motion.

Crutch-walking skills.

Observe "gait" for proper weight-bearing; note foot and crutch placement, climbing and descending stairs, walking, etc.

ASSESSMENT

Objective appraisal.

Review all objective data; note relative strengths and weaknesses.

Subjective appraisal.

Carefully observe student performance during all testing. Record anecdotal remarks that focus on the process—how the individual performs the skill (so that you gain insight into prescriptive needs). Observe, particularly, how the child performs the tasks of daily living. For example, can the child, who uses crutches, sit down and get up unassisted? Does the child with an atrophied arm use both arms when performing tasks, etc.? Also note how responsive the child is to physical activity in and out of class. Keep a record of the activities he participates in of his own volition.

PRESCRIPTION

The problems manifested by children with motor disabilities or limitations are so diverse that it is difficult to present a specific, definitive activity for each disability. The teacher must analyze each child's behavior and prescribe accordingly. Each prescriptive program should include exercises to improve the problem as well as modified games. The following material is presented as guidelines:

Exercises for orthopedic problems.

The following exercises are recommended by Doolittle.[4]

1. Knee injury
   a. Quadriceps setting by firming the quadriceps with no movement involved (preface with warm-up exercises).
   b. Straight leg lift from a supine position.
   c. When the prescription calls for quadriceps

[1]The Orthopedic Equipment Company, Bourbon, Indiana Manufactures the International Standard Goniometer.

[2]Jack R. Leighton, "A Simple Objective and Reliable Measure of Flexibility," p. 205.

[3]Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child*, pp. 83-84.

[4]John H. Doolittle, "Exercises for Orthopedic Problems," pp. 5-8. Mimeographed. Reprinted by permission.

exercises, use an iron boot or sandbags attached to the foot of the injured leg. The weight should be such that the student is able to perform ten to twelve repetitions through the full range of motion. Stress maximum extension at the knee joint with each repetition and a dorsi-flexed ankle to stretch the gastroc-soleus. Progressively increase resistance until the student can perform two to three sets of ten to fifteen repetitions with a maximum resistance of fifty to sixty pounds. (**Note**: Utilize footrest to eliminate stress on the flexed joint.)

d. Development of the hamstrings can be accomplished by having the student flex the knee through the full range of motion from a prone position on a mat or a table.
e. Bicycling: the range of motion may be controlled by raising and lowering the seat.

2. Sprained ankle. The recommended exercises deal with inversion-type sprains since they occur most frequently.
   a. Passive dorsi and plantar flexion, followed by inversion, eversion and circumduction (stress eversion).
   b. Apply the overload principle to exercises in item "a" by strapping an iron boot or sandbag to the foot. (Note: Eversion and dorsi flexion are the most important exercises.)
   c. As the student progresses, jogging and rope skipping may be included in the program.
3. Dislocated shoulder.
   a. Stimulate flexion, extension, adduction, abduction, circumduction and minimize the possibility of tightness and contractures by having the subject bend forward at the waist, place his uninjured arm on a table or chair, and allow the affected arm to perform relaxed pendular movements (side to side, back and forth, and circling).
   b. Repeat item "a" holding a light weight to increase resistance.
   c. Exercises with pulley weights: (Note: Stress adduction and internal rotation.)
      (1) Shoulder adduction (pectoralis major): Start at arm's length with the affected shoulder toward the pulley weights. Grasp the handle and pull across the chest and down to the opposite hip.
      (2) Shoulder adduction (deltoid, latissimus dorsi, teres major): From the same position as in item (1), pull down and behind the back to the opposite hip.
      (3) Horizontal abduction (deltoid, latissimus dorsi): Stand with the affected shoulder away from the pulley weights. Reach across the chest, grasp the handle and pull across and down.
      (4) Shoulder extension (latissimus dorsi, teres major:) Stand facing the pulley weights. Reach forward, grasp the handle at shoulder height and pull down and behind the hip.
      (5) Shoulder adduction (latissimus dorsi, teres major, pectoralis major): Stand with affected shoulder toward the pulley weights. Grasp the handle at shoulder height and pull down to the side.
   d. Exercises with dumbbells:
      (1) Shoulder flexion (deltoid, coracobrachialis): Flex the upper arm to shoulder height with the elbow fully extended.
      (2) Upper arm hyperextension, shoulder extension (latissimus dorsi, teres major): Starting with the arm at the side, hyperextend the upper arm through the full range, about 45 degrees.
      (3) Shoulder abduction in the horizontal plane (deltoid, supraspinatus): With the arm at the side, abduct the upper arm to about 90 degrees. Increase the range as the student's recovery progresses.
      (4) Shoulder circumduction (deltoid, supraspinatus): With the upper arm abducted to 80 to 90 degrees, circumduct the arm. Increase the size of the circles as the student's recovery progresses.
      (5) Internal and external rotation of the upper arm (infraspinatus, teres major, subscapularis): Supine lying position with the upper arm abducted to 90 degrees and the elbow flexed to 90 degrees. Lower the dumbell by external rotation, then raise the dumbbell to the starting position and lower it by internal rotation at the upper arm. Note: This exercise should be assigned when it is felt the shoulder is healing well. When the exercise is introduced, guards should be required in front and back to limit the range of motion because excessive rotation might be contraindicated.
      (6) Elbow flexion (biceps): With the entire arm supported on a table, perform one arm dumbbell curls. Number to be performed: These exercises may be prescribed in sets of two, three and sometimes four, with ten to fifteen repetitions to a set. Begin with light weights, both on the pulleys and with the dumbbells and increase the amount as the student's recovery progresses. Note: Exercising

regimen should not be prescribed until the medical inspector signs a clearance. However, exercises should be prescribed for other than the injured area(s) to minimize general body atrophy.

Adaptation of games and activities.

Providing games and activities for the handicapped on an individualized basis necessitates consideration of each child's abilities and limitations so that modifications and adaptations can be made to ensure safe participation. Doolittle[1] recommends the following modifications for games and activities for the handicapped:

General considerations:

1. Most children with permanent disabilities will have already developed necessary modifications to permit their participation in certain activities. Allow these children to proceed at their own rate of involvement. If they experience difficulty or cannot make the necessary adjustments, step in and assist.
2. Adaptations must be made to suit the child's abilities rather than his disabilities.
3. Modification of game rules should not be discouraged and should be regulated to meet the needs of the group.
4. Try not to change a game to such a degree that the children lose sight of what they started to play.
5. When working with a new student, begin slowly and gradually introduce him to new activities. Keep in mind the child may have some fear of new experiences, may become embarrassed or display a lack of initiative.

Methods of modifying games and activities:

1. Reduce the size of the playing area:
   a. Change the boundary lines
   b. Increase the number of players.
   c. Decrease the height of the net or goal.
   d. Use equipment that will reduce the range of play.
   e. Net-type games may be played through a hoop.
2. Use lighter equipment:
   a. Plastic bats, "Wiffle-type" balls.
   b. Large plastic beachballs: bladder balls.
   c. Yarnballs, styrafoam balls.
3. Slow down moving objects:
   a. Change the throwing style to underhand.
   b. Throw ball with one bounce.
   c. Roll the ball.
   d. Stationary ball: place it on home plate or place it on a batting T.
   e. Increase the size of the ball.
   f. Decrease the weight of the ball.
   g. Decrease the air pressure within the ball.
4. Modify the rules:
   a. Sit down or lie down rather than stand.
   b. Walk rather than run.
   c. Kick rather than strike.
   d. Throw or strike rather than kick.
   e. Permit additional trials: strikes, throws, and jumps.
   f. Allow for substitution.
   g. Reduce the time periods of the game.
   h. Reduce the number of points required to win a contest.
5. Provide additional rest periods:
   a. Discuss rule infractions.
   b. Discuss strategy and team play.
   c. Rotate players in and out of the game or into active and inactive positions.
   d. Reduce the time periods of the game.
   e. Provide quiet type games which may keep the student busy during rest periods: nok-hockey, box soccer, darts, ring toss, etc.

Modification of games and activities for exceptional children: As a rule, activities are selected from those which are most appropriate for various age groups of normal children. The difference lies in the application of these activities.

Adapting individual and dual sports:

Archery: use lighter bow, arrows with rubber tips. Student may sit, draw targets.

Bait-fly casting: place target boards on gym floor or field at various distances. Student may sit.

Badminton: four players on each side, each playing small zone. "Hoopbird" played with bird or yarnball.

Bowling: use plastic "gym-bowl" equipment or plastic detergent bottles. Student may bowl from a chair or sit on the floor. Roll ball through cardboard tube or box.

Croquet: use plastic mallets and whiffleballs, vary the distance to the wickets.

Gymnastics: tumbling, parallel bars, high bar, rings, side horse.

Golf: hit plastic practice ball into old tennis or volleyball nets which are faced with burlap. Putt on an old rug into a can placed on its side. Make miniature golf course from odds and

[1]John H. Doolittle, "Adaptation of Games and Activities," 4 pp. Mimeographed. Reprinted by permission.

ends.

Handball: one wall, use partially deflated volleyball or smaller playground ball to slow the action of the game.

Horseshoes: rubber shoes or quoits can be used in and out of doors. Throw shoes into a box.

Shuffleboard: shorten distance between scoring zones. Student may sit.

Swimming: obtain American Red Cross *Swimming for the Handicapped.*[1]

Table Tennis: use larger paddles, make small table-size hoop and play as "hoopbird." Place plywood sides on the table so the ball will not bounce off the table as often; off the sides, ball remains in play.

Tetherball: sit or stand, punch or kick. Make small table-size game with broomstick and small rubber ball in a silk stocking.

Quiet games: nok-hockey, table shuffleboard, pool, darts, beanbag toss games, box soccer.

Adapting team sports:

Baseball-softball-type games: use light plastic bats and whiffleballs, batting tee. Use base runners, two sets of bases (one of shorter distances), throw the ball into the field rather than bat it. Give children positions that require little movement.

Kickball: punch or throw the ball rather than kick it. Place ball on home plate rather than roll it.

Basketball type games: limit movement in the game by playing 21, Around the World, Six Court, Half-Court, Scooter Basketball, Foul Shooting, Barrelball. Have student do the foul shooting for both teams.

Soccer-hockey-type games: have student play goalie. Reduce size of goal. Scooter games: punching a playground ball. Hockey played with old brooms and volleyball. Barrelball: shooting for hole. Volleyball-type games: deck tennis, Newcomb, use larger soft bladder ball. Have both teams sit on the floor; put net at 4-5'.

EVALUATION

Readminister all objective tests at nine-week intervals. Note progress based on review of objective and subjective data. Post-operative and convalescent students who have recouped their vitality should be recommended for release from the program. However, do not schedule those students in the unrestricted program until you receive a medical confirmation.

Students with permanent disabilities or limitations should be integrated into the unrestricted program whenever such an arrangement is *educationally sound*. Flexible scheduling probably affords the best opportunity to meet the needs of the child with a permanent handicap. Under such an arrangement, the child's D&A Program would be designed to provide those types of individualized activities that would aid him to functional optimally, within his limitations. It would, further, provide the teacher time to assess the student's progress and to represcribe as indicated. On the other hand, integrating the child in with his peer group will aid his adjustment socially and emotionally. Further, it will serve as a sound educational experience for the non-handicapped. They will learn that the handicapped child is a human being who needs to be accepted as a functioning member of society.

Record student achievement on the Behavioral Performance Chart (Appendix 13) as follows: physical fitness and motor ability pre- and post-test scores; muscle girth, SDI, range of motion—pre- and post-test scores; self-concept and attitude inventories—pre- and post-test scores; and criterion-referenced norms—pass or fail.

STUDENT LEARNING EXPERIENCES

1. *Measure Muscle Girth, Strength Decrement Index and Range of Motion, Grades 9-12.*

   Teacher's Role. a. Explain and demonstrate the correct technique of: (1) measuring muscle girth with a tape. (2) determining the Strength Decrement Index of a muscle (see formula below).

   Computing the Strength Decrement Index[1]

   $$SDI = \frac{Sb\text{-}Sa}{Sb} \times 100$$

   Symbols: SDI = Strength Decrement Index
   Sb = Strength before exercise
   Sa = Strength after exercise

   b. Explain the effects of exercise on muscular development and flexibility. c. Distribute the necessary testing equipment and assist the students in testing.

   Student's Role. a. Pair and work with a partner measuring muscular girth of the disuse atrophied and normal limb, Strength Decrement Index (one's tolerance limits), and range of motion. b. Check with the instructor to ensure the use of the proper testing technique. c. Record his scores on his Prescription Card.

2. *Measure Performance of Skills Necessary for the Daily Pursuits of Life (wheelchair, crutch—and cane-walkers, Grades 1-12).*

   Teacher's Role. a. Observe and evaluate the student's ability to: (1) get in and out of the wheelchair (time basis). (2) locomote on crutches or cane(s) properly via

[1] American Red Cross, *Swimming for the Handicapped.*

[2] H. Harrison Clarke, Clayton T. Shay and Donald K. Mathews, "Strength Decrement Index—A Test of Muscular Fatigue," p. 376.

the appropriate gait (given distance on a time basis). (See below.) (3) fall safely during locomotion with crutches or cane(s). (4) ambulate up and down stairs unassisted.

Cane and Crutch Walking Procedure[1]

The cane is not a weight-bearing device but rather a supportive or balance aid; therefore, it should be held in the hand *opposite* the injured extremity. This technique establishes a good three-point base providing greater stability.

For proper fitting, the cane should rest on the floor two to four inches laterally and forward at the foot (the elbow should be flexed to approximately 30 degrees). The end of the cane should be equipped with a suction-type rubber tip.

Common types of crutches:

Auxiliary –those which fit up under the arm (axilla)

Lofstrand–for those who do not require underarm support. A cuff fitting around the forearm and a handgrip provide support.

Fitting axillary crutches:

The length of the crutch should permit two fingers to be placed between the crutch pad and axilla. The handgrip should be adjusted to allow some flexion of the elbow. Be sure the end of the crutch is equipped with a good sized suction-type rubber crutch tip to provide good traction and shock absorption.

Types of crutch gaits:

Four-point–a nonweight-bearing gait used by people with extreme ambulation difficulties. One crutch moves forward followed by the opposite foot. Then the other crutch moves forward followed by the other foot. Right crutch, left foot; left crutch, right foot.

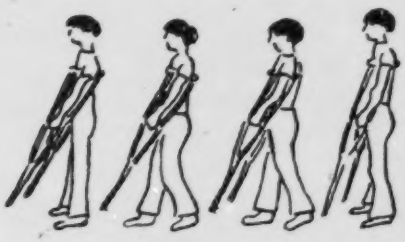


Fig. 10-3 Four Point

Three-point–a very common gait used by people with a single leg involvement such as sprained ankle, broken leg, or amputation. The crutches are placed forward, taking all weight off the injured extremity. The unaffected leg swings through and forward. In time the injured extremity may move forward with the crutches accepting partial weight.

Fig. 10-4 Three-Point

Two-point–often used when there is involvement of both legs and a compromise can be made between speed and stability. One crutch and the opposite foot are placed forward at the same time, followed by the other crutch and foot. The corss-pattern of walking is employed.

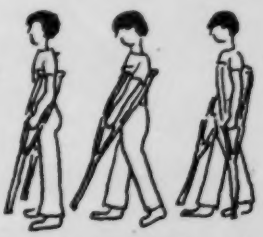


Fig. 10-5 Two-Point

Drag-to–follow procedure outlined in "swing-to" except that the subject moves both feet forward by a "dragging" action rather than the straightening of the elbows.

Drag-through–follow procedure outlined in "swing-through" except that the subject moves both feet forward of the body by a "dragging" action rather than by straightening the elbows and "jack-knifing" the body.

Swing-to–used by people with extreme involvement of both legs and some involvement of the trunk so that the legs cannot be moved independently. The crutches are placed in front of the body, then the subject leans into the crutches and pushes the body off the floor by straightening the elbows. As soon as the heels touch the floor between the crutches, the shoulders are moved rearward to shift the body weight to the feet so that the crutches can be brought forward.

Swing-through –used by people with extreme involvement of both legs and some involvement of the trunk so that the legs cannot be moved independently. The crutches are placed forward, then both

[1]John H, Doolittle, "Cane and Crutch Walking," *Physical Education 400: Laboratory Exercises 5*, 2 pp. Mimeographed. Reprinted by permission.

legs swing through and forward by straightening the elbows and "jack-knifing" slightly, thus permitting the crutches to be moved forward once again. These people wear leg braces and have been taught how to accept their body weight.

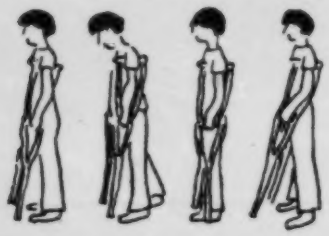


Fig. 10-6 Swing-To

Fig. 10-7 Swing-Through

Stair-climbing:

Ascending—place the unaffected foot on the tread of the step, then bring up the crutches and the injured extremity. When spotting, stand behind the student and hold his belt.

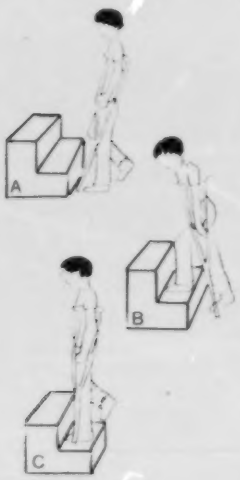


Fig. 10-8 Ascending

[1]Ronald C. Adams, Alfred N. Daniel and Lee Rullman, *Games, Sports and Exercises for the Physically Handicapped.*

Descending—place the crutches and the injured extremity on the lower tread of the step, then step down with the unaffected extremity. When spotting, stand in front of the student. Instruct the student to place his feet several inches from the riser of the step as this will provide more room for clearance, both ascending and descending.

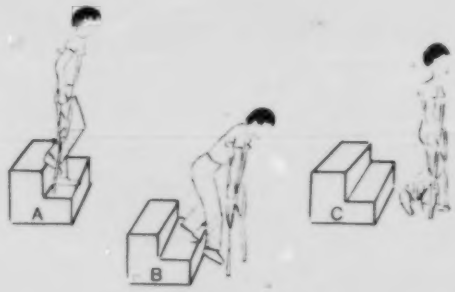


Fig 10-9 Descending

Student's Role. a., Perform the tasks as required by the teacher, grades 1-8. b. Perform the tasks as required by the teacher, grades 9-12. In addition, evaluate personal performance in terms of skills that need to be improved. Discuss his personal appraisal with teacher.

3. *Develop an Individualized Prescription, Grades 1-12.*
   Teacher's Role. a. Devise a prescriptive program to ameliorate or eliminate the motor disabilities or limitations of students in grades 1-8, based on testing and observation. b. Assist the students in grades 9-12 in the development of their prescriptions.
   Student's Role. a. Develop his own prescription, grades 9-12. His prescription must be approved by the instructor and must *be consistent with the recommendation of the medical inspector.*
4. *Participate in Games and Leisure Time Activities, Grades 1-12.*
   Teacher's Role. a. Provide a vareity of games and leisure time activities that are modified according to the handicapping conditions manifested by the students.
   Note: Adams, Daniel and Rullman provide an excellent list of games and activities in their text.[1]
   b. Structure the teaching and learning situation so that the games can be implemented. c. Provide the necessary supplies and equipment. d. Prepare a checklist to identify student interests and participation in games and leisure time activities. e. Adapt activities to focus on abilities rather than disabilities. f. Establish an intramural program for the handicapped.

   Student's Role. a. Select and participate in the games and leisure time activities of his choice during the school day, after school, and at home. b. Select and participate in two *new* games and leisure time activities of his choice.

CHAPTER ELEVEN

COMMUNICATION DISORDERS

DEFINITION

Communication disorders may be defined as physical handicaps which impede the functioning of one or more of the special senses, as exemplified by the deaf, the hard of hearing, the blind, the partially sighted, the autistic, and those with various speech impediments. [1]

BEHAVIOR OBJECTIVES

1. The student demonstrates an improvement in physical fitness and motor ability (Kindergarten-12).
   Evaluative criteria: ten percent improvement in those test items he can perform. Student performance is assessed by the teacher.
2. The partially-sighted and blind student demonstrates improved posture (Kindergarten -12).
   Evaluative criteria: analysis of pre- and post-posture screening test results—ten percent improvement. Student performance is assessed by the teacher.
3. The blind student demonstrates an increased kinesthetic awareness of total body position in executing a task (grades 4-12). Student performance is assessed by the teacher.
4. The blind student demonstrates an increased kinesthetic awareness of the proper arm position necessary to propel an object accurately (grades Kindergarten-12). Evaluative criteria: ten percent improvement in target throwing test based on pre- and post-test score comparison. Student performance is assessed by the teacher.
5. The student desires to participate in physical activity modified according to his needs (grades Kindergarten-12).
   Evaluative criteria: increased student participation in the activities during class time or after school, and evidence of personal satisfaction. Student performance is assessed by the teacher.

TEST

Physical fitness and motor ability.

Performance of as many test items as possible, while cognizant of the safety factor

Posture screening test.

Administer the posture screening to the partially-sighted and blind student at nine-week intervals. (Refer to Chapter Six for test directions.)

Kinesthetic awareness of body position.

Administer the forward roll test to the blind student at nine-week intervals.

Note: When the student can perform the test efficiently, devise others (e.g. backward roll, tripod balance, etc.)

Kinesthetic limb position and accuracy.

Administer the target-throwing test to the blind student at nine-week intervals. Directions: Using the Motor Ability Test for eye and hand accuracy, the teacher is to verbally describe the point of impact of each throw to provide the subject with feedback.

Kinesthetic Target-Throwing and Serial-Ordering Test. (Courtesy of the Township of Ocean School District)
Test Item: Kinesthetic Target Throwing Test; Factor: Kinesthesis

Prior to testing, the subject is required to "pace" the distance to the target and to "feel" the target dimensions by use of his hands and arms. During the tactile process, the instructor explains the "points" for each rectangle. The subject is then afforded three practice throws with his dominant hand.

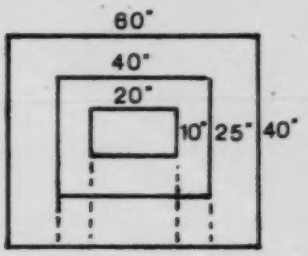


Fig. 11-1 Kinesthetic Target-Throwing Test

[1] Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child.* p. 186.

After each throw, the instructor provides verbal feedback as to the accuracy (e.g., "low and to the left," "high and to the right," etc.). Finally, the subject throws the whiffleball (softball circumference) at the target ten times (without verbal feedback). The subject may use either an overhand or underhand throwing motion from a distance of ten feet. The ball must strike the target without previously touching the floor for a correct attempt.

Scoring: 3 points, inner rectangle and line; 2 points, middle rectangle and line; and 1 point, outer rectangle and line.

Attempts: 10 *Scoring*: Total points for ten attempts.

Student learning experience: have a sighted student test the blind student.

ASSESSMENT

Objective appraisal

Review all objective data; note relative strengths and weaknesses.

Subjective appraisal.

Carefully observe student performance during all testing. Record anecdotal remarks that focus on the process;—how the individual performs the skill. Particularly observe how the child performs the tasks of daily living. For example, record remarks regarding the blind subject's general posture (static and dynamic), pattern of locomotion, etc.

PRESCRIPTION

The problem manifested by children with communication disorders are so diverse that it would be difficult to present specific, definitive activities for each disorder. The teacher must analyze each child's behavior and prescribe accordingly. Each prescriptive program should focus equally on the child's *disabilities and abilities*. The following materials are presented as guidelines:

Partially-sighted and blind. The visually handicapped tend to manifest faulty body mechanics, poor coordination and balance, and a general inability to perform motor tasks. Thus, prescriptive programs should focus on types of activities which will improve these conditions. As an example, movement exploration would be extremely beneficial because it develops total use and control of the body.

Having the blind student run with a partner is another beneficial activity as it improves the child's locomotor pattern (blind children tend to take short, faltering steps because of their constant fear of colliding with an object).

Hard-of-hearing and deaf. Most auditorily handicapped students can participate in the unrestricted program, with minor program modifications. However, a "buddy" should be assigned, especially during team games, so that he can touch his partner to indicate the termination of play. Another important point to remember is that in speaking you should always face the deaf student so that he can read your lips.

A student with peripheral deafness may manifest a balance problem due to reduced functioning of the semi-circular canals.[1] In such situations, it would be advisable to schedule the student in D&A one day per week, plus participation in the unrestricted program. D&A activities should be of the balance-type in which the subject performs close to the floor.

Communication disorders. The autistic child, who is usually non-communicative, should be scheduled in the D&A program primarily because he needs individualized attention. He tends to manifest the following behavior patterns and characteristics:

1. A facial countenance devoid of emotions.
2. Complete detachment from the world of reality.
3. Resistance to perform many requested tasks.
4. Preference for isolationism—will avoid groups.

General prescriptive suggestions would include variety of movement education experiences. However, it is essential that the teaching method used incorporate the following features:

1. Make the learning experiences very simple and concrete.
2. Use *gentle persuasion* to insure performance of the act.
3. *Immediately reinforce* the most minute accomplishment *positively*.
4. *Repetitively*, have the child perform the act accomplished until he has "internalized" the skill.
5. Constantly vary the skill so that motor patterns are learned rather than discrete motor skills.

EVALUATION

Readminister all objective tests at nine-week intervals. Note progress based on a review of objective and subjective data. Record student achievement on the Behavioral Performance Chart (Appendix 13) as follows physical fitness and motor ability tests—pre- and post-test scores; posture screening—pre- and post-test scores; and criterion-referenced norms—pass or fail.

STUDENT LEARNING EXPERIENCE

1. *Devise and Participate in Verbally-Guided Throwing-Test and Games for the Blind Student, Grades Kindergarten-12.*

[1] Ronald C. Adams, Alfred N. Daniel and Lee Rullman, *Games, Sports and Activities for the Physically Handicapped*. p. 17.

Teacher's Role. a. Explain "kinesthesis" (i.e., an awareness of the body parts in various positions) and how its development can aid the blind student.

b. Review use of the motor ability target-throwing test.

c. Pair sighted-students with the non-sighted for testing purposes.

Student's Role.

a. The Sighted-Student

(1) Review testing and scoring procedure for administering the motor ability target-throwing test.

(2) Provide verbal feedback for each of his blind partner's attempts (10). For example, if the object strikes low to the left, he should comment, "raise the next attempt slightly upward and to the right."

(3) Record his partner's total score for ten attempts (pre-test).

(4) Participate with his partner in other verbally-guided games.

(5) Administer post-test at periodic intervals and note progress.

b. The Blind Student

(1) Perform the test as directed, while concentrating on verbal clues.

(2) Attempt to "feel" the arm and hand position as his accuracy improves.

(3) Participate in other verbally-guided games.

(4) Attempt to throw accurately at the target, using only the kinesthetic "feel" of the arm and hand position..

2. *Devise and Participate in Other Verbally-Guided Tests and Activities for the Blind Student, Grades 3-12.*

Teacher's Role. a. Devise tests and games for the blind student in grades K-8.

b. Assist and guide the partner in developing tests and devising games that enhance the blind and partially-sighted student's kinesthetic performance, grades 9-12.

Student's Role.

a. The Sighted Student

(1) Devise tests and games to assess and improve the partner's ability to perform skills that involve movement such as tumbling and proper body mechanics, bowling, etc., Grades 9-12 (e.g., Bowling via use of the auditory goal-locater).[1]

(2) Participate with his partner in track and field events (providing verbal and tactile information).

(3) Reassess partner's performance at periodic intervals.

b. The Blind Student

(1) Perform all tests and games as directed, while focusing on the verbal, kinesthetic, and tactile cues.

(2) Endeavor to develop kinesthetic and tactile abilities to the extent that he can perform the skills without verbal assistance.

3. *Devise and Participate in Tests and Games for the Deaf Student, Grades Kindergarten–12.*

Teacher's Role.

a. Administer the balance and postural orientation and ocular pursuit test items from the Motor Ability Test Battery to students in grades K-8. (Refer to Ocular Pursuit Test cited below.[2])

Monocularity, Binocularity, Convergence

Test Description:

Holding a pencil 20-24" from the subject's eyes, the instructor moves the pencil horizontally, vertically, diagonally (both directions) and in a circle. The subject is requested to follow the movements with both eyes, without moving his head. (Move pencil in 18" arc with head as center of circle).

Assessment

track horizontally _____ jerky pattern _____

tracking vertically _____ midline problem _____

tracking diagonally _____ loses object _____

tracking circle _____ lazy eye _____

REMARKS: _____

_____

_____

_____

b. Devise games to enhance factors listed in "a" above.

c. Pair the deaf students with students that do not have a communication disorder, grades 9-12.

d. Assist and guide partners in developing tests and devising games that enhance the deaf student's balance and postural orientation and visual scanning ability.

Student's Role.

a. The signted student:

(1) Devise tests and games to assess and improve the deaf student's balance and use of his eyes.

(2) Notify his buddy "when play ends" during team games.

b. The deaf student

(1) Perform all tests and games as directed, while concentrating on developing his kinesthetic and visual apparatus.

[1] Manufactured by the American Printing House for the Blind, 1839 Frankfort Avenue, P.O. Box 6085, Louisville, Kentucky 40206.

[2] Newell C. Kephart, *The Slow Learner in the Classroom.* pp 1460149.

BIBLIOGRAPHY

Adams, Ron, "A Physical Conditioning Exercise Program for the Asthmatic Patient" Therapeutic Recreation and Adapted Physical Education, Children's Rehabilitation Center, University of Virginia Hospital, Charlottesville, Virginia.

Adams, Ronald C., Alfred M. Daniel and Lee Rullman, *Games, Sports and Activities for the Physically Handicapped,* Philadelphia, Pennsylvania, Lea & Febiger, 1972.

American Red Cross, *Swimming for the Handicapped,* Washington, D.C.: American Red Cross, 1955.

Baker, Bruce M. and Rene L. Eris, *An Introduction to PERT–CPM,* Homewood, Illinois: Richard D. Irwin, Inc. 1964.

Bogert, L. Jean, *Nutritional and Physical Fitness* 7th ed. Philadelphia, Pennsylvania: W.B. Saunders Company, 1960.

Bolea, Angelo S., Donald W. Felker and Margaret D. Barnes, "A Pictorial Self-Concept Scale for Children in K-4" *Journal of Educational Measurement,* Volume 8, No. 3, Fall 1971.

Burns, Joseph L. *A Catalog of Computer Programs for PERT,* Baltimore, Maryland: Administration Service Division, Westinghouse Electric Corporation, December 15, 1963.

Clarke, H. Harrison and David H. Clarke, *Developmental and Adapted Physical Education,* Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1963.

Clarke, H. Harrison, Clayton T. Shay and Donald K. Mathews, "Strength Decrement Index–A Test of Muscle Fatigue" *Archives of Physical Medicine and Rehabilitation* XXXVI, No. 6, June 1955.

Cook, Desmond L. *Program Evaluation and Review Technique Applications in Education.* Washington, D.C.: U.S. Department of Health, Education, and Welfare, Office of Education, 1966.

Doolittle, John H. "Adaption of Games and Activities" Physical Education 400, Laboratory Exercise 1 University Park, Pennsylvania, The Pennsylvania State University, n.d.

"Exercises for Orthopedic Problems" Physical Education 10. Adapted Physical Education Handbook, University Park, Pennsylvania, The Pennsylvania State University.

"Cane and Crutch Walking" Physical Education 400: Laboratory Exercises 5. University Park, Pennsylvania: The Pennsylvania State University. n.d.

Early, George H., Frances E. Early, Earl J. Heath, "Classroom Evaluation of Learning Disabilities," *Educational Technology,* Sept. 1971.

Hilsendager, Donald, Harold K. Jack and Lester Mann, *Basic Motor Fitness Test for Emotionally Disturbed Children and Mentally Handicapped Children: Preliminary Report.* National Institute of Mental Health. Grant Number 1-TL-MH-8543-1, 5. 1968

Jacobson, Edmund M.D. *You Must Relax, Progressive Relaxation, Teaching and Learning,* Chicago: National Foundation for Progressive Relaxation.

Johnson, L. William, "Objective Test in Basketball for High School Boys" unpublished Master's Thesis, State University of Iowa, 1934.

Kephart, Newell C. *The Slow Learner in the Classroom,* Columbus, Ohio: Charles E. Merrill Books, Inc. 1960.

Leighton, Jack R. "A Simple Objective and Reliable Measure of Flexibility" *Research Quarterly.* XIII, No. 2, May 1943.

Moran, Joan M. and Leonard H. Kalakian, *Movement Experiences for the Mentally Retarded or Emotionally Disturbed, Child.* Minneapolis, Minnesota: Burgess Publishing Company, 1974.

Mueller, Grover W. and Josephine Christaldi, *A Practical Program of Remedial Physical Education.* Philadelphia, Pennsylvania, Lea & Febiger, 1966.

Olson, Arne L. "Theory and Practice of Physical Conditioning" Temple University, Fall, 1963.

Pryor, Helen, *Width-Weight Tables,* 2nd rev. ed. Stanford, California: Stanford University Press, 1936.

Vodola, Thomas M. *Individualized Physical Education Program for the Handicapped Child.* Englewood-Cliffs, New Jersey: Prentice-Hall, Inc., 1973.

"The Effects of Participation Time Variations on the Development of Physical Fitness, Motor Skills and Attitudes." Unpublished doctoral dissertation, Temple University, 1970.

"Physical Education for the Handicapped: A Neglected Approach" Chapter 7 in *Handbook on Learning Disabilities,* ed. Robert E. Weber, New Jersey Association for Children with Learning Disabilities, Englewood-Cliffs, New Jersey: Prentice-Hall, Inc., 1974.

Descriptive Statistics Made Easy for the Classroom Teacher, Bloomfield, New Jersey: The C.F. Wood Company, 1974.

Wear, C.L. Construction of Equivalent Forms of an Attitude Scale," *Research Quarterly* XXV, 1955.

Wessel, Janet, *Movement Fundamentals Figure Form,* Fun 3rd ed. Prentice Hall, Inc., Englewood-Cliffs, New Jersey, 1970.

Willgoose, Carl C. "Body Type and Physical Fitness" *Journal of Health, Physical Education and Recreation,* Sept. 1956.

APPENDICES

APPENDIX 1
DEVELOPMENTAL AND ADAPTED POLICY STATEMENT

The Scheduling and Releasing of Students in Developmental and Adapted Physical Education *(adopted by D&A Council on January 19, 1971)*

All personnel desirous of referring a student to D&A shall forward the request via the building principal's office. Requests must be submitted on a teacher referral form (available in the nurse's office) (see Appendix 3).

If the principal approves the referral, he shall forward the form to the school nurse. (If the request is denied, he shall fill in the disposition part of the form and forward a copy to the teacher making the referral.)

Upon receiving the teacher referral form, the nurse shall route the form according to the following procedure: (1) Low physical vitality, motor coordination, diagnostic testing—to the D&A teacher; and (2) medically oriented problems (nutritional, postural, orthopedic, postoperative/convalescent, asthmatic, etc.—to the school physician for an examination.

Following scheduling by the D&A teacher (no. 1 above), he or she shall fill in the disposition part of the form and return it to the building principal via the school nurse. Following the medical examination (no. 2 above), the form shall be signed and dated by the school physician. At the discretion of the physician, the child may be admitted to the program or referred to the family physician.

If the school physician approves the assignment to D&A, he or she must fill out the medical excuse form (prescribing specific exercises or activities, listing program duration, etc.). The nurse shall record all pertinent information on the disposition part of the teacher referral form and forward it to the D&A teacher. (The nurse shall file the medical excuse form in her office.)

If the school physician recommends referral of the child to the family physician, the school nurse shall forward a medical excuse form to the parent. Admittance to the program requires parental approval (signature), physician's approval (signature), a list of prescribed exercises or activities, and program duration. If admission to the program is granted, the nurse shall fill in pertinent data on the disposition part of the teacher referral form and forward it to the D&A teacher. (The nurse shall file the medical excuse form in her office.) If admission to the program is denied, a follow-up phone call shall be made to the family physician by the school nurse. If admission is still denied, the information is recorded on the medical excuse form and teacher referral form (the former is filed in the nurse's office; the latter is forwarded to the building principal).

Source: Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child* © 1973, pp. 20-21. Reprinted by permission of Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

APPENDIX 2
SUPPLY AND EQUIPMENT NEEDS FOR D&A PROGRAM IMPLEMENTATION

Code	Item	Number Recommended	Source
PC5026	Shoulder Breadth, Length Caliper	Two per school	J.A. Preston Corp. 71 Fifth Avenue New York, N.Y. 10003
PC5028	Large Skinfold (Fat) Caliper	One per school	J.A. Preston
PC5155	Dry Spirometer	One per school	J.A. Preston
PC5156	Disposable Paper Mouthpieces	1000 per school	J.A. Preston
PC5059	Flexometer	One per school	J.A. Preston
	or		
PC5054	Plastic Goniometer (Transparent)	Two per school	J.A. Preston
PC5022A	Symmetrigraf (Posture Grid)	Two per school	J.A. Preston
No. 305	Stall Bars, Starter Unit (optional)	One per school	Nissen Corp. 930 27th Avenue Cedar Rapids, Iowa
No. 39	Wall Mounted Horizontal Ladder (optional)	One per school	Nissen Corp.
	or		
Construct Horizontal Ladder (optional)		One per school	Maintenance Dept.
No. 92602	Utility Playground Ball, PG-8½	Twelve per school	J.L. Hammett Co. 2393 Vaux Hall Rd. Union, N.J. 07083
No. 92655	Fun Balls (Plastic) S-650	Twelve per school	J.L. Hammett
No. 92670	Saf-T Bat (Plastic) No. 705	Two per school	J.L. Hammett
	Plastic Measuring Tape 36"	Twelve per school	Local Fabric Shop
	White Shoe Polish, Bottle	Six per school	Local Supermarket
No.39170	Water Color Marking Pen, Black	Two per school	J.L. Hammett
No. 61145	Pegboard and Pegs, No. 7615 (optional)	One per school	J.L. Hammett
Cut out	Pegboards and Purchase Golf Tees	Six per school	Maintenance Dept.
No. 9201	Audible Ball, Electronic	One per school	Royal Nat'l Inst., for the Blind 224-6-8 Great Portland Street London, W-1, England
No. 92663	Audi-Ball, No. AB-30 (optional)	Two per school	J.L. Hammett
No.1-0357	Staley Sports Field Kit (optional)	One per school	American Printing House for the Blind 1839 Frankfort Ave. P.O. Box 6085 Louisville, Kentucky 40206
No. 1-0304	Portable Audible Goal Locator	One per school	American Printing House for the Blind

APPENDIX 2 (Continued)

	Barbells	Twelve per school	J.L. Hammett
	Stopwatch	One per school	J.L. Hammett
	Beanbags and targets (optional)	One set per school	J.L. Hammett
	Chinning Bar	Two per school	Nissen Corp.
	Mats, 5' x 10'	Four per school	Nissen Corp.
92882	Number 3 Fleece Balls	12 (K-4)	J.L. Hammett
92645	Number CT-850 Endure Tetherball	1 (K-8)	J.L. Hammett
92670	Number 705 Safe-T-Bat	6 (K-8)	J.L. Hammett
92656	Number S-630 Fun Balls	6 (K-8)	J.L. Hammett
92655	Number S-650 Fun Balls	6 (K-8)	J.L. Hammett
62730	Watercolor Marker (Black)	6 (3-12)	J.L. Hammett
92663	Number AB-30 Audi-Ball	1 (K-12)	J.L. Hammett
92730	Jump Rope (7')	12 (1-12)	J.L. Hammett
PEC2747A	Beanbag Game	1 (K-4)	J.L. Hammett
PEC2747B	Beanbag Set (72)	1 (K-4)	J.L. Hammett
PEC5022A	Symmetrigraf	1 (3-12)	J.A. Preston
PEC2600	Doorway Chinning Bar	2 (1-12)	J.A. Preston
PEC2766A	Deluxe Safe-T-Play Batting Set	1 (K-4)	J.A. Preston
PEC2771B	Pitch Back	2 (K-4)	J.A. Preston
LP6050	Coordination Skills	1 (K-6)	Kimbo Educational P.O. Box 246 Deal, N.J. 07723
EA606-7	Developing Perceptual Motor Needs	1 (K-4)	Kimbo Educational
EA605	Developing Body Awareness	1 (K-4)	Kimbo Educational
EA655	Relaxation	1 (K-6)	Kimbo Educational
EA657	Dynamic Balance	1 (K-4)	Kimbo Educational
EA658	Balance Beam Activity	1 (K-6)	Kimbo Educational
EA656	Pre-Tumbling Skills	1 (K-4)	Kimbo Educational
LP5000	Developing Body-Space Perception Motor Skills	1 set (K-4)	Kimbo Educational
LP5000	Teaching Children Mathematics Through Games	1 set (K-6)	Kimbo Educational
LP8060	To Move Is To Be	1 set (K-4)	Kimbo Educational
LP4000	Rhythmic Rope Jumping	1 set (K-12)	Kimbo Educational
4032-34	Developing Exercises	1 set (K-9)	Dance Records, Inc. Waldwick, N.J. 07463
4008	Elementary School Exercises To Music	1 (K-6)	Dance Records, Inc.

APPENDIX 3

DEVELOPMENTAL AND ADAPTED PHYSICAL EDUCATION REFERRAL FORM

Township of Ocean School District

Route to: 1. Teacher
2. Principal
3. Nurse
4. D&A Teacher
5. Return to Principal

Dept. of Health, Physical Education & Driver Education

Date _____

Teacher Making Referral _____ School _____

Student's Name _____ Sex _____

Last First Grade Age M F

Suspected Reasons for Referral (Please Check)

Developmental Problem:

*Posture _____
*Nutritional _____
Low Physical Vitality _____
Motor (Balance, coordination) _____

Adapted Problem (medical)

*Orthopedic _____
*Post-Operative/Convalescent _____
*Other Medical _____

Additional remarks (please explain) _____

_____

_____

*to be screened by physician

DISPOSITION OF REFERRAL

Date

To _____
From _____
Re _____

Copies for: Principal
Teacher
D&A Teacher
Nurse
Learning Disabilities Consultant
Director of Health and Physical Education
Office of Special Services

Source: Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child* ©1973, pp. 269-70. Reprinted by permission of Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

APPENDIX 4
LETTER TO FAMILY PHYSICIAN ELICITING SUPPORT

Date _____

Physician's Address
Dear Dr. _____ :

Enclosed are some materials relating to our physical education program for students with developmental or medically oriented problems. We invite you to stop in and visit with us so that you can see the program in "action."

Our staff never prescribes any activities other than for motor incoordination or a low level of physical fitness. Dr. John Malta, the school physician, or the family physician involved must make the necessary diagnoses and prescriptions; our staff will comply with said instruction.

We would appreciate any suggestions or materials you may give us regarding program implementation so that we can better serve our students. I am firmly convinced our program will only be successful if we, the staff, work closely with the medical profession. Thank you for your cooperation.

Sincerely,

THOMAS M. VODOLA, Ed.D.
Supervisor, K.-12

TMV:sd
Enclosures

APPENDIX 5
MEDICAL EXCUSE FORM

Date _____

Dear Parent:

Recognizing the fact that students with varied physical limitations evidence different needs, the Department of Health, Safety, and Physical Education has designed a program to afford students (post operative, convalescent, and the physically handicapped) an opportunity to participate in a modified activities program. The program is not remedial or corrective, but rather consists of a selected variety of modified games, activities, and recreational pursuits which are designed to meet the specific needs of each student. The program is determined by your family physician, or the school physician (as per your request).

If you would like your child to be enrolled in one of the classes, please sign this form, submit to the proper medical authority, and forward to my office at your earliest convenience. Please contact me if you have any additional questions regarding the program.

Sincerely,

Thomas M. Vodola, Ed.D.
Supervisor

Source: Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child*, © 1973, pp. 272-273. Reprinted by permisson of Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

To be completed by the parent:

I would like to have my son/daughter _____ assigned to the Adapted Physical Education Program.
(Pupil's name)

_____
(Parent's Signature)

To be completed by the family or school physician:

Nature of the illness or physical limitation _____

_____

Approximate duration of the excusal _____

Please indicate those activities you recommend the student participate in (only those activities you recommend will be included in the student's program):

1. Postural exercises _____
2. Limited exercises _____
3. Modified games (basketball, volleyball, soccer) _____
4. Recreational activities (table tennis, shuffleboard, bowling, quoits, archery) _____
5. Weight training (modified) _____
6. Gymnastics (modified) _____
7. Rope skipping and other endurance-type activities _____
8. Other _____

Signed _____
(Family or school physician)

APPENDIX 6
MASTER SCHEDULING FORM

STUDENT NAME	DATE in	DATE out	GRADE	AGE	DAY AND PERIOD	CLASSIFICATION	CLASSIFIED BY	DISPOSITION	ADDITIONAL REMARKS

Source: Thomas M. Vodola, *Individualized Physical Education Program for the Handicapped Child* c , 1973. p. 273. Reprinted by permission of Prentice-Hall, Inc., Englewood Cliffs, New Jersey,

APPENDIX 7
ADMISSION OR RELEASE PASS

Time: _____
Date: _____

From: Dr. Vodola
To: Study Hall Supervisor
Re: Developmental & Adapted (D&A)
Physical Education Scheduling

Please *add/drop* _____
(student's name)
to/from the _____ study hall roster on _____
period day(s) of the week

Please initial: Time: _____

Study hall supervisor _____

Physical education teacher _____

PLEASE RETURN TO D&A TEACHER

Courtesy of the Township of Ocean School District.

APPENDIX 8

ELEMENTARY PHYSICAL EDUCATION TEACHING STATION

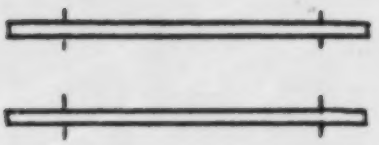
(Courtesy of the Township of Ocean School District.)

STATION NO. 1

Activity: Kicking
Factor: Eye-Foot Accuracy

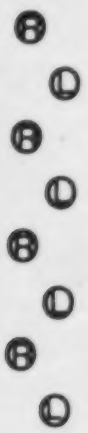
STATION NO. 2

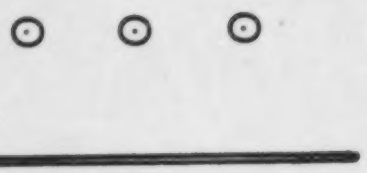
Activity: Balance Beam
Factor: Dynamic/Static Balance



STATION NO. 3

Activity: Marching
Factor: Gross Body Coordination





STATION NO. 5

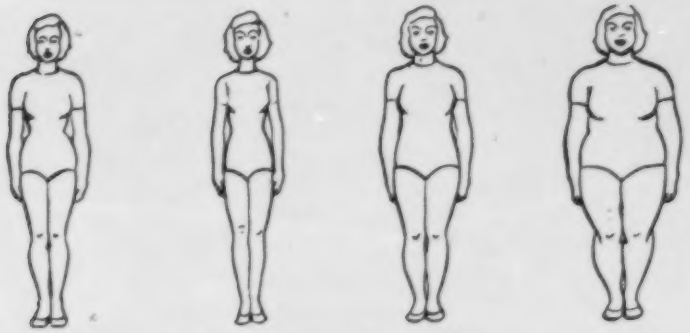
Activity: Batting Tees
Factor: Eye-Hand Accuracy

STATION NO. 4

Activity: Ball Bounce/Catch
Factor: Eye-Hand Coordination

MINI–TEACHING STATIONS

APPENDIX 9
DETERMINATION OF BASIC BODY STRUCTURE (SOMATOTYPE)



The most common type | The frail type | The husky type | The soft fat type

The Most Common Type 5 3 3	*The Frail Type* 1 1 7	*The Husky Type* 1 7 1	*The Soft Fat Type* 7 1 1
Extremeley thin Low in fat tissue Small front to back dimensions of trunk 1 2	Average 3 4 5	Most obese Large fat deposits Thick abdomen region, cheeks, hips, thighs 6 7
Extremely underdeveloped muscles with poor tone Muscles squeezed or pushed in contracted state—arms, buttocks, calves, thighs. 1 2	Average 3 4 5	Extremely developed muscles large and firm with good tones in biceps, buttocks, calves, thighs, abdomen 6 7
Extremely thick and heavy bones of ankle, knee, elbow, wrist joints 1 2	Average 3 4 5	Extremely thin and frail linear skeleton with small wrist, ankle, knee, and elbow joints 6 7

Source: Adapted from Janet Wessel, *Movement Fundamentals: Figure, Form, Fun*, 3rd ed. © 1970, pp. 17-18. Reprinted by permission of Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

APPENDIX 10

PRE-KINDERGARTEN SCREENING TEST

(Courtesy of the Township of Ocean School District.)

BIRTH DATE _____

NAME _____

SCREENED BY: _____

TEST ITEM No. 1: *HOP; 2L, 3R*

FACTOR: Balance/postural orientation, coordination serial order, laterality and cognition.

Test description: Teacher to demonstrate hopping and changing feet without identifying left or right. Instruct the child to hop twice on left foot and three times on the right foot. (If the student cannot distinguish his right from left foot, the instructor is to place his hand on the leg he wants the child to hop with.)

ASSESSMENT:

Balance on one foot	Serial order (l, r, or r, l)
Shifting weight smoothly	Laterality
Gross coordination	Concept of numbers

Fig. A-1 Hopping

TEST ITEM No. 2: *BALL-BOUNCE AND CATCH*

FACTOR: Eye/hand coordination.

Test description: Have the child bounce an 8" playground ball to waist height and attempt to catch the ball with two hands (without the aid of any part of the body). Three attempts.

[1] Newell C. Kephart, *The Slow Learner in the Classroom*, pp. 146-149.

ASSESSMENT:

Eye/hand coordination Color discrimination

Fig. A-2 Ball-Bounce and Catch

TEST ITEM No. 3: *OCULAR PURSUIT*[1]

FACTOR: Monocularity, binocularity, convergence.

Test description: Holding a pencil 20-24" from the subject's eyes, the instructor moves the pencil horizontally, vertically, diagonally, (both directions) and in a circle. The subject is requested to follow the movements with both eyes, without moving his head. (Move pencil in 18" arc with head as center of circle.)

ASSESSMENT:

Tracking horizontally _____	Jerky pattern _____
Tracking vertically _____	Midline problem _____
Tracking diagonally _____	Loses object _____
Tracking circle _____	Lazy eye _____

Fig. A-3 Ocular Pursuit

TEST ITEM No. 4: *SPEECH* _____

SUMMARY OF EVALUATION: _____

_____

APPENDIX 11
PICTORIAL SELF-CONCEPT SCALE TEST DIRECTIONS/RECORDING FORM.*

DIRECTIONS

Boys and girls, my name is _____, . Today we are going to do something that is *NOT* a school test but is like a game. (Have teacher help in passing out cards, colored sheets, and small blue piece of paper). Make sure teacher sees there are *boy* cards and *girl* cards.)

Does everyone have a blue sheet of paper, a pink sheet and a yellow sheet? Does everyone have a pack of pictures?

Put your colored paper on the desk with the blue on the left. (Show them by holding up papers, or drawing them on blackboard, or taping the sheets to the blackboard—big blue at the left as you face the blackboard.)

Now this is where the game begins. You each have a pack of pictures. In each picture there is a boy or girl with a star on his shirt or dress. Do you see the child with the star on his shirt or dress on your first picture? So you are looking for the child that has the star on his shirt or dress. Sometimes there will be pictures with more than one child. Which child will you be looking for? (A. child with a star, etc.) If you think that the boy or girl with the star is like you, put the picture on the blue sheet of paper. (Point to sheets on board). The blue sheet of paper is for pictures that are like you. If you think that the boy or girl with the star is sometimes like you, put the picture on the pink sheet of paper. The pink sheet of paper is for pictures that are sometimes like you. If you think that the boy or girl with the star is not at all like you, put the picture on the yellow sheet of paper. The yellow sheet of paper is for pictures that are not at all like you.

If the picture of the child with the star is like you, where will you put the picture? (On blue.) If the picture of the child with the star is sometimes like you, where will you put the picture? (Pink.) If the picture of the child with the star is not at all like you, where will you put the picture? (Yellow.)

Do you understand what you are going to do? When you have a question raise your hand and I'll help you. Remember you are the one to choose where your pictures will go. When you are through, leave the pictures on the sheets of paper, raise your hand, and I will come to see you when I can. I might be busy so please leave the cards in the piles and wait. Walk around, check layout.

***Note:** A packet of test cards will be provided in class.

Source: Angelo S. Bolea, Donald W. Felker and Margaret D. Barnes, "A Pictorial Self-Concept Scale for Children in K-4" *Journal of Educational Measurement*, VIII, No. 3 (Fall, 1971), 223-224.

TO: Schools/Agencies Implementing Project Active
FROM: Dr. Thomas M. Vodola
RE: Administration of Self-Concept Scale

Suggestions based on previous testing experience

1. Administer only the "B" Form for pre- and post-tests until we check the "A" Form out again. The "A" Form did not correlate highly with the total test (50 cards) therefore it may not be valid.
2. Whether testing one student, or a group, have all students complete the placement of one card before moving on to the next card.
3. Explain each card to the individual or group. **Note:** In the directions it states if the child in the picture is like you place in one pile, etc. Our testing revealed inaccuracies with that approach because the facial expression is the key factor for self-image. For example, "B" card number 6 shows a pupil doing a cartwheel *with a smile on his face*. A child may select "not like him" because he cannot do a cartwheel when in actuality he should select "like him" if he is a happy child as the facial countenance indicates.
4. If possible, have the classroom teachers administer the test. I believe they will find the experience enjoyable and will be interested in the post-test results. If you want additional cards, you may purchase by contacting E.D. Corporation (refer to page 190 for complete address).
5. Doubt that the test can be used with trainables or any students who cannot comprehend; thus, test only students *who can reason*.
6. Record pre- and post-test scores on Evaluative Data Sheets and submit to the Project Director in June.

SCORING PROCEDURES

1. The scoring of the PSC is facilitated by the method in which the cards are gathered after the subject has sorted them into piles of "Like Me," "Sometimes Like Me" and "Not Like Me." The most advantageous method of collection is to put the child's name on a blue slip of paper. Use three envelopes stapled together (see diagram) and then put all of the cards from the "Like Me" pile in an envelope with the blue slip, the cards on the "Sometime. ." pile in the middle envelope, and the cards from the "Not Like Me" pile in the other end envelope. This can be done quickly and is

almost essential for group testing. These cards then can be retained for preparation for scoring till a later time.

2. Scoring can be done by hand by using the "Pictorial Self-Concept Scale Score Sheet" which contains directions. This is time-consuming and is not advisable except when only a few are to be scored.
3. ED Corp. has a scoring program and will run data for you for a small charge. (Contact: ED Corp., 822 N. Salisbury Street, W. Lafayette, Indiana 47906.)
4. The data must be put on computer data cards to use the scoring program. Each card in the "Like Me" pile gets a score of 1, each card in the "Sometimes" pile gets a score of 2, and each card in "Not Like Me" pile gets a score of 3. The use of IBM mark sense cards or 1230 answer sheets allows you to record the data and then easily produce a computer data deck for scoring. The transferring of scores to data sheets takes approximately 3 minutes per subject tested. Rather than purchasing from ED Corp., the service of producing a computer deck (which is .06 per card) you should check with your measurement and research center to see if they have facilities for producing a data deck for you. The charge for scoring by ED Corp., is then only $5.00 for each group of tests up to 1,000 tests per group.

APPENDIX 11 (Continued)

(Courtesy of the Journal of Educational Measurement)

PICTORIAL SELF-CONCEPT SCALE SCORE SHEET

Item	Card Value	Like Me	Sometimes Like Me	Not Like Me
1	8.1			
2	43.8			
3	30.8			
4	37.9			
5	14.1			
6	18.3			
7	17.1			
8	18.4			
9	14.1			
10	31.1			
11	12.5			
12	40.1			
13	45.4			
14	38.1			
15	35.4			
16	9.9			
17	2.1			
18	44.4			
19	11.5			
20	10.9			
21	22.5			
22	39.4			
23	15.0			
24	45.4			
25	40.1			
26	34.4			
27	38.5			
28	39.8			
29	37.5			
30	39.5			
31	39.6			
32	13.8			
33	15.9			
34	12.3			
35	14.5			
36	18.5			
37	16.9			
38	15.3			
39	15.4			
40	13.9			
41	37.3			
42	13.1			
43	25.0			
44	16.6			
45	37.0			
46	10.3			
47	32.4			
48	6.1			
49	45.1			
50	40.4			
	Total=			
	No.=			
	Average=			

Definitions:

Item – number on pictorial card.

Card Value – as determined by eight judges. Low value – positive. High value = negative.

Like me: Sometimes Like me: Not like me. Determined by card placement during test.

Totals – determined by adding the card values for cards placed in each column.

No. – number of cards placed in each column.

Average – Total of each column card values divided by number of cards placed in that column.

© Bolea, Barnes, & Felker, 1967.

Name _____

Score = ($\bar{X}$ of Not Like Me Col.) Minus ( ) $\bar{X}$ of Like Me Col. + 50

High score = positive self-concept.

APPENDIX 12
WEAR ATTITUDE INVENTORY INSTRUCTIONS, ADMINISTRATION
(Courtesy of A.A.H.P.E.R.)

"DIRECTIONS–PLEASE READ CAREFULLY: Below you will find some statements about physical education. We would like to know how you feel about each statement. You are asked to consider physical education only from the standpoint of its place as an activity course taught during a regular class period. No reference is intended in any statement to inter-scholastic or intramural athletics. People differ widely in the way they feel about each statement. There are no right or wrong answers.

You have been provided with a separate answer sheet for recording your reaction to each statement. (1) Read each statement carefully, (2) go to the answer sheet, and (3) opposite the number of the statement place an "x" in the square which is under the word (or words) which best expresses your feeling about the statement. After reading a statement you will know at once, in most cases, whether you agree or disagree with the statement. If you agree, then decide whether to place an "x" under "agree" or "strongly agree." If you disagree, then decide whether to place the "x" under the "disagree" or "strongly disagree." In case you are undecided (or neutral) concerning your feelings about the statement, then place an "x" under "undecided." Try to avoid placing an "x" under "undecided" in very many instances.

Wherever possible, let your own personal experience determine your answer. Work rapidly, do not spend much time on any statement. This is not a test, but is simply a survey to determine how people feel about physical education. Your answers will in no way affect your grade in any course. In fact, we are not interested in connecting any person with any paper—so please answer each statement as you actually feel about it. Be sure to answer every statement."

Form A

1. If for any reason a few subjects have to be dropped from the school program, physical education should be one of the subjects dropped.
2. Physical education activities provide no opportunities for learning to control the emotions.
3. Physical education is one of the most important subjects in helping to establish and maintain desirable social standards.
4. Vigorous physical activity works off harmful emotional tensions.
5. I would take physical education only if it were required.
6. Participation in physical education makes no contribution to the development of poise.
7. Because physical skills loom large in importance in youth, it is essential that a person be helped to acquire and improve such skills.
8. Calisthenics taken regularly are good for one's general health.
9. Skill in active games or sports is not necessary for leading the fullest kind of life.
10. Physical education does more harm physically than it does good.
11. Associating with others in some physical education activity is fun.
12. Physical education classes provide situations for the formation of attitudes which will make one a better citizen.
13. Physical education situations are among the poorest for making friends.
14. There is not enough value coming from physical education to justify the time consumed.
15. Physical education skills make worthwhile contributions to the enrichment of living.
16. People get all the physical exercise they need in just taking care of their daily work.
17. All who are physically able will profit from an hour of physical education each day.
18. Physical education makes a valuable contribution toward building up an adequate reserve of strength and endurance for everyday living.
19. Physical education tears down sociability by encouraging people to attempt to surpass each other in many of the activities.
20. Participation in physical education activities makes for a more wholesome outlook on life.
21. Physical education adds nothing to the improvement of social behavior.
22. Physical education class activities will help to relieve and relax physical tensions.
23. Participation in physical education activities helps a person to maintain a healthful emotional life.
24. Physical education is one of the more important subjects in the school program.
25. There is little value in physical education as far as physical well-being is concerned.

Source: C.L. Wear, "Construction of Equivalent Forms of An Attitude Scale," *Research Quarterly*, XXV (1955) pp. 113-119.

26. Physical education should be included in the program of every person.
27. Skills learned in a physical education class do not benefit a person.
28. Physical education provides situations for developing desirable character qualities.
29. Physical education makes for more enjoyable living.
30. Physical education has no place in modern education.

Form B

1. Associations in physical education activities give people a better understanding of each other.
2. Engaging in vigorous physical activity gets one interested in practicing good health habits.
3. The time spent in getting ready for and engaging in a physical education class could be more profitably spent in other ways.
4. A person's body usually has all the strength it needs without participation in physical education activities.
5. Participation in physical education activities tends to make one a more socially desirable person.
6. Physical education in schools does not receive the emphasis that it should.
7. Physical education classes are poor in opportunities for worthwhile social experiences.
8. A person would be better off emotionally if he did not participate in physical education.
9. It is possible to make physical education a valuable subject by proper selections of activities.
10. Developing a physical skill brings mental relaxation and relief.
11. Physical education classes provide nothing which will be of value outside the class.
12. There should not be over two one-hour periods per week devoted to physical education in schools.
13. Belonging to a group, for which opportunity is provided in team activities, is a desirable experience for a person.
14. Physical education is an important subject in helping a person gain and maintain all-round good health.
15. No definite beneficial results come from participation in physical education activities.
16. Engaging in group physical education activities is desirable for proper personality development.
17. Physical education activities tend to upset a person emotionally.
18. For its contributions to mental and emotional well-being physical education should be included in the program of every school.
19. I would advise anyone who is physically able to take physical education.
20. As far as improving physical health is concerned a physical education class is a waste of time.
21. Participation in physical education class activities tends to develop a wholesome interest in the functioning of one's body.
22. Physical education classes give a person an opportunity to have a good time.
23. The final mastering of a certain movement or skill in a physical education class brings a pleasurable feeling that one seldom experiences elsewhere.
24. Physical education classes provide values which are useful in other parts of daily living.
25. Physical education contributes little toward the improvement of social behavior.
26. Physical education should be required of all who are physically able to participate.
27. The time devoted to physical education in schools could be more profitable used in study.
28. The skills learned in a physical education class do not add anything of value to a person's life.
29. Physical education does more harm socially than good.

APPENDIX 12 (Continued)

WEAR ATTITUDE INVENTORY

FORM A & FORM B (CIRCLE ONE)

PRINT FULL NAME _____ GRADE _____ DAYS & PERIOD _____ DATE _____ INSTRUCTOR _____

	N*	VALUE
5		
4		
3		

	N	VALUE
2		
1		
TOTAL		

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1.	( )	( )	( )	( )	( )
2.	( )	( )	( )	( )	( )
3.	( )	( )	( )	( )	( )
4.	( )	( )	( )	( )	( )
5.	( )	( )	( )	( )	( )
6.	( )	( )	( )	( )	( )
7.	( )	( )	( )	( )	( )
8.	( )	( )	( )	( )	( )
9.	( )	( )	( )	( )	( )
10.	( )	( )	( )	( )	( )
11.	( )	( )	( )	( )	( )
12.	( )	( )	( )	( )	( )
13.	( )	( )	( )	( )	( )
14.	( )	( )	( )	( )	( )
15.	( )	( )	( )	( )	( )
16.	( )	( )	( )	( )	( )
17.	( )	( )	( )	( )	( )
18.	( )	( )	( )	( )	( )
19.	( )	( )	( )	( )	( )
20.	( )	( )	( )	( )	( )
21.	( )	( )	( )	( )	( )
22.	( )	( )	( )	( )	( )
23.	( )	( )	( )	( )	( )
24.	( )	( )	( )	( )	( )
25.	( )	( )	( )	( )	( )
26.	( )	( )	( )	( )	( )
27.	( )	( )	( )	( )	( )
28.	( )	( )	( )	( )	( )
29.	( )	( )	( )	( )	( )
30.	( )	( )	( )	( )	( )

*Example:	N	VALUE
5	𝍸	25
4	II	8

APPENDIX 13
STUDENT PERFORMANCE CHART

Student's Name _____ School _____ Sex _____ Grade _____
Last First

COMPETENCY AREA	PERFORMANCE OBJECTIVE/EVALUATIVE CRITERIA	SCORE PRE	SCORE POST	% GAIN	PASS OR FAIL PRE	PASS OR FAIL POST
DEVELOPMENTAL PROGRAM	THE STUDENT:					
Low Physical Vitality	1. Achieves a minimum Physical Fitness Index Score of 50, or a single stanine score of 4 on the Township of Ocean Physical Fitness Test Battery, grades 1-12. (Note: students with a PFI Score of 35 or below, or a single stanine score of 2 or below are to be referred to D&A. Record raw scores and pass or fail.)	____	____	____	____	____
	2. Identifies his primary and secondary somatotyping characteristics, 9-12 (pass or fail).				____	____
	3. Computes his percentile/stanine scores and identifies his weaknesses and strengths on a continuum, grades 9-12 (pass or fail).				____	____
	4. Demonstrates a more positive self-concept as evidenced by the Self-Concept Pictorial Scale, grades 1-4 (raw score and pass or fail). (10%)	____	____		____	____
	5. Demonstrates a more positive attitude toward physical activity, as evidenced by the Wear Attitude Inventory, grades 5-12 (raw scores and pass or fail). (10%)	____	____		____	____
Low Motor Ability	1. Achieves a minimum Motor Ability Index Score of 50, or a single stanine score of 4 on the Township of Ocean Motor Ability Test Battery, grades K-2. (Note students with an MAI score of 35 or below or a single stanine score of 2or below are to be referred to D&A.) (Record raw scores and pass or fail.)	____	____		____	____
	2. Performs his prescribed motor tasks correctly, grades K-2 (pass or fail).				____	____
	3. Demonstrates a more positive self-concept as evidenced by the Self-Concept Pictorial Scale, grades K-4 (raw scores and pass or fail). (10%)	____	____		____	____

APPENDIX 13 *(Continued)*

COMPETENCY AREA	PERFORMANCE OBJECTIVE/EVALUATIVE CRITERIA	SCORE PRE	SCORE POST	% GAIN	PASS OR FAIL PRE	PASS OR FAIL POST
ADAPTED PROGRAM	THE STUDENT:					
Postural Abnormalities	1. Achieves a minimum score of 85, with no single component score of less than 4 on the modified New York Posture Screening Test, grades 3-12. (Note: scores of 70 or below, or 1 are basis for recommending examination by the school physician. (Record raw scores and pass or fail.)	____	____	____	____	____
	2. "Screen," another student and identify static and dynamic posture problems (kyphosis, lordosis and scoliosis), grades 7-12 (pass or fail).				____	____
	3. Evidences sound body mechanics during his normal, daily pursuits, grades 3-12 (pass or fail).				____	____
	4. Improves a scoliotic condition as evidenced by leg length measuring, grades 3-12 (raw scores).	____	____	____		
	5. Improves a scoliotic condition as evidenced by measurement of scapulae distance from vertebrae column, grades 3-12 (raw scores).	____	____	____		
Nutritional Deficiencies	1. Achieves a "true" body weight of less than 10% below, or above his "predicted" body weight, grades 1-12. (Record raw scores and pass or fail.)	____	____	____	____	____
	2. Determines his "true" body weight, "predicted" body weight and Nutritional Index, grades 9-12 (pass or fail).				____	____
	3. Determines his caloric needs to sustain his present body weight and to lose ½ pound per week, grades 9-12 (pass or fail).				____	____
	4. Determines the amount of activity he needs to lose ½ pound per week, grades 9-12 (pass or fail).				____	____
	5. Defines and differentiates between the terms "obesity" and "overweight," grades 9-12 (pass or fail).				____	____
	6. Devises and demonstrates an "endurance circuit" of exercises that is conducive to losing weight, grades 9-12 (pass or fail).				____	____
	7. Manifests a more positive attitude toward physical activity as evidenced by the Wear Attitude Inventory, grades 5-12 (raw scores and pass or fail). (10%)	____	____	____	____	____

APPENDIX 13 *(Continued)*

COMPETENCY AREA	PERFORMANCE OBJECTIVE/EVALUATIVE CRITERIA	SCORE PRE	SCORE POST	% GAIN	PASS OR FAIL PRE	PASS OR FAIL POST
Adapted Program *(Continued)* Mental Retardation or Learning Disabilities	1. Achieves a minimum Physical Fitness Index Score of 40, or a minimum single stanine score of 3on the Township of Ocean Physical Fitness Test Battery, grades 1-12. (Note: Students with PFI score of 35 or below, or a single component score of 2or below are to be referred to the D&A Program. (Record raw scores and pass or fail.)	_____	_____	_____	_____	_____
	2. Achieves a minimum Motor Ability Index of 40, or a minimum single stanine score of 3 on the Township of Ocean Motor Ability Test Battery, grades K-12. Note: Students with an MAI score of 35 or below, or a single component score of 2 or below are to be referred to the D&A Program. (Record raw scores and pass or fail.)	_____	_____	_____	_____	_____
	3. Demonstrates a more positive self-concept as evidenced by the Self-Concept Pictorial Scale, grades K-12 (depending on severity of disability) (raw scores and pass or fail). (10%)	_____	_____	_____	_____	_____
	4. Demonstrates the ability to integrate the following perceptual-motor responses: auditory-motor; visuo-motor; and auditory-visuo-motor (while making a decision), grades K-12 (pass or fail).				_____	_____
	5. Demonstrates skill proficiency in two new recreational activities, grades K-12 (pass or fail).				_____	_____
	6. Demonstrates increased ability to sequentially order tasks, grades K-12 (pass or fail).				_____	_____
	7. Manifests an increased "attention-span" as evidenced by a pre- and post-time test, grades K-12 (pass or fail).				_____	_____
Breathing Problems	1. Evidences a 20% improvement in his vital capacity score, grades K-12 (raw scores and pass or fail).	_____	_____	_____	_____	_____
	2. Manifests a positive self-concept, or attitude toward physical activity, grades K-12 (raw scores and pass or fail). (10%)	_____	_____	_____	_____	_____
	3. Prescribes his own activity program based on his evaluation of his tolerance limits, grades 7-12 (pass or fail).				_____	_____
Motor Disabilities/Limitations	1. Demonstrates a 10% improvement in those physical fitness/motor ability items he can perform, grades K-12 (raw scores and pass or fail).	_____	_____	_____	_____	_____

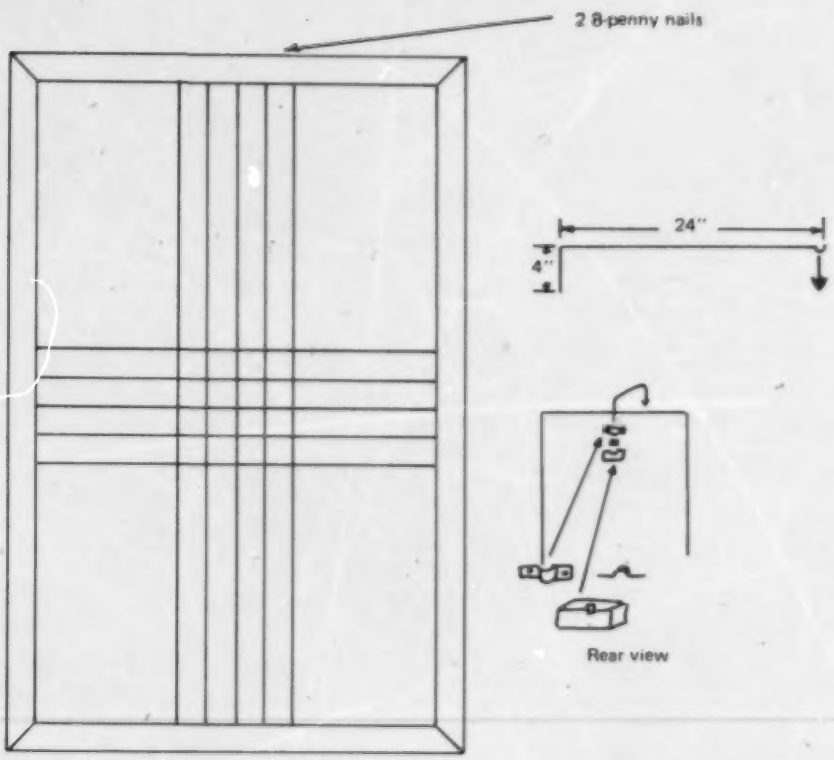
COMPETENCY AREA	PERFORMANCE OBJECTIVE/EVALUATIVE CRITERIA	SCORE PRE	SCORE POST	% GAIN	PASS OR FAIL PRE	PASS OR FAIL POST
Adapted Program *(Continued)*	2. With atrophied muscles, evidences a 5% increase in muscle girth measurements, grades K-12 (raw scores and pass or fail).	____	____	____	____	____
	3. With atophied muscles, demonstrates a 10% increase in muscular strength, grades K-12 (raw scores and pass or fail.)	____	____	____	____	____
	4. With a range of motion limitation, evidences a 5% increase in flexibility, K-12 (raw scores and pass or fail).	____	____	____	____	____
	5. Demonstrates the ability to determine his muscle girth measurements, Strength Decrement Index and range of motion, grades 9-12 (pass or fail).				____	____
	6. Manifests a positive self-concept or attitude toward physical activity (10% improvement) grades K-12 (raw scores and pass or fail).	____	____	____	____	____
	7. Who utilizes crutches, demonstrates proficiency in ambulatory skills (i.e., walking, climbing and descending stairs unassisted, grades K-12 (pass or fail).				____	____
	8. Evidences a desire to participate in physical activity modified commensurate with his needs, as evidenced by increased participation in physical education/recreation activities, grades K-12 (pass or fail).				____	____
Communication Disorders	1. Demonstrates a 10% improvement in physical fitness/motor ability, grades K-12 (raw scores and pass or fail).	____	____	____	____	____
	2. Who is partially sighted/blind, manifests a 10% improvement in posture, grades K-12 (raw scores and pass or fail).	____	____	____	____	____
	3. Who is blind, demonstrates an increased kinesthetic awareness of total body position in executing a forward roll, grades 4-12 (pass or fail).				____	____
	4. Who is blind, demonstrates an increased kinesthetic awareness of the proper arm position necessary to propel an object accurately, grades K-12. (10% improvement in target-throwing test) (pass or fail).				____	____
	5. Evidences a desire to participate in physical activity modified commensurate with his needs as evidenced by increased participation in physical education/recreation activities, grades K-12 (pass or fail).				____	____

APPENDIX 14

POSTURE SCREENING GRID CONSTRUCTION DIRECTIONS

(Courtesy of the Township of Ocean School District)

CONSTRUCTABLE ITEMS



Materials needed:

Grid: one 1/8" x 4' x 8' masonite
Frame: one 3/4" x 3" x 24'
Rod: one 3/8" x 30"
Clamps: two
Wooden block: one 1" x 4"
Plumb bob: one
Paint:
1 quart of flat black enamel
1 pint of fast-drying white lacquer
Striping tool: one
Straight edge: 8' long, 3" wide

Instructions:

1. Reduce masonite to proper size.
2. Paint masonite.
3. Place frame on masonite; secure with 3/4" roofing nails (miter corners).
4. Draw horizontal and vertical lines. Start at midpoint and paint lines 2" apart with the striping tool. Be sure to secure the straight edge to the frame with clamps to insure straight lines
5. Touch up any overrun of striping with black enamel border.

APPENDIX 15

TABLE OF NUMBERS[1]

DIRECTIONS FOR USE OF THE CONVERSION TABLES

Directions for use of the Conversion Tables

1. Record all raw data on the "tally sheet."
2. Accumulate frequency scores (check to ensure the "N" is correct).
3. Locate the Table of Numbers for the "N" of your population.
4. Place the tally sheet adjacent to the correct "N" table and proceed as indicated in the following example. (Seeking the raw score for the percentile; N = 78:
   a. Locate P_4 for "N" of 78; the number indicated is "3." Thus, 4 percent of 78 subjects is "3."
   b. Locate the "cf" column on your tally sheet and identify the "cf" of "3"; the "typed" raw score number to the left of "3" is the raw sc[illegible] subject must attain to achieve the 4th percentile.
      Note: Assuming the "cf" column only has numbers "2" and "4," you select the raw score adjacent to the "cf" score of "4." Rule to remember: when the percentage of cases you are seeking falls between two "cf" scores, you *always* select the higher raw score as being representative of the percentile in question.
   c. Record the raw score identified in the left hand column on the tally sheet adjacent to P_4.
   d. Proceed in the similar manner to determine all percentile scores on your tally sheet.
5. The Tables of Numbers have been established for sample sizes ranging from 30 to 199. However, you can use the tables to identify the percentage of "N" you are seeking regardless of size via the following procedure:
   a. Data: N of 279; seeking 70 percent of 279.
   b. Locate the "N" Table for 79.
   c. Identify the number that is representative of P_{70} (i.e., 55).
   d. Locate the "N" Table for 100. (Actually, in most instances, steps "d" though "h" can be computed mentally.)
   e. Identify the number that is representative of P_{70} (i.e., 70).
   f. Multiply 2 x 70 (i.e., 140).
   g. Add 55 and 140 (i.e., 195).
   h. Therefore, 70 percent of 279 is *195*.

[1]Source: Thomas M. Vodola, *Descriptive Statistice Made Easy for the Classroom Teacher* , © 1974, pp. 23-32, 36. Reprinted by permission of the author, P.O. Box 93, Neptune City, New Jersey.

APPENDIX 15 (Continued)

Township of Ocean School District

RAW SCORE TALLY SHEET

N=_____

EVENT _____ SEASON _____ AGE ____ SEX ___ SCHOOL _____

Directions: Tally all raw scores as follows–

Percentiles					
99 ___	125	100-	75-	50-	25-
96 ___	124	99-	74-	49-	24-
90 ___	123	98-	73-	48-	23-
80 ___	122	97-	72-	47-	22-
75 ___	121	96-	71-	46-	21-
70 ___	120	95-	70-	45-	20-
65 ___	119	94-	69-	44-	19-
60 ___	118	93-	68-	43-	18-
50 ___	117	92-	67-	42-	17-
40 ___	116	91-	66-	41-	16-
35 ___	115	90-	65-	40-	15-
30 ___	114	89-	64-	39-	14-
25 ___	113	88-	63-	38-	13-
20 ___	112	87-	62-	37-	12-
10 ___	111	86-	61-	36-	11-
4 ___	110	85-	60-	35-	10-
1 ___	109	84-	59-	34-	9-
	108	83-	58-	33-	8-
	107	82-	57-	32-	7-
	106	81-	56-	31-	6-
	105	80-	55-	30-	5-
	104	79-	54-	29-	4-
	103	78-	53-	28-	3-
	102	77-	52-	27-	2-
	101	76-	51-	26-	1-
					0-

APPENDIX 15 (Continued)

TABLES OF NUMBERS[1]

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 30 to 39

N=	30	31	32	33	34	35	36	37	38	39	=N
P99	30	31	32	33	34	35	36	37	38	39	P99
96	29	30	31	32	33	34	35	36	36	37	96
90	27	28	29	30	31	32	32	33	34	35	90
80	24	25	26	26	27	28	29	30	30	31	80
75	23	23	24	25	26	26	27	28	29	29	75
70	21	22	22	23	24	25	25	26	27	27	70
65	20	20	21	21	22	23	23	24	25	25	65
60	18	19	19	20	20	21	22	22	23	23	60
50	15	16	16	17	17	18	18	19	19	20	50
40	12	12	13	13	14	14	14	15	15	16	40
35	11	11	11	12	12	12	13	13	13	14	35
30	9	9	10	10	10	11	11	11	11	12	30
25	8	8	8	8	9	9	9	9	10	10	25
20	6	6	6	7	7	7	7	7	8	8	20
10	3	3	3	.3	3	3	4	4	4	4	10
P1	.3	.3	.3	.3	.3	.4	.4	.4	.4	.4	P1

TABLES 40 to 49

N=	40	41	42	43	44	45	46	47	48	49	=N
P99	40	41	42	43	44	45	46	47	48	49	P99
96	38	39	40	41	42	43	44	45	46	47	96
90	36	37	38	39	40	41	41	42	43	44	90
80	32	33	34	34	35	36	37	38	38	39	80
75	30	31	32	32	33	34	35	35	36	37	75
70	28	29	29	30	31	32	32	33	34	34	70
65	26	27	27	28	29	29	30	31	31	32	65
60	24	25	25	26	26	27	28	28	29	29	60
50	20	21	21	22	22	23	23	24	24	25	50
40	16	16	17	17	18	18	18	19	19	20	40
35	14	14	15	15	15	16	16	16	17	17	35
30	12	12	13	13	13	14	14	14	14	15	30
25	10	10	11	11	11	11	12	12	12	12	25
20	8	8	8	9	9	9	9	9	10	10	20
10	4	4	4	4	4	5	5	5	5	5	10
4	2	2	2	2	2	2	2	2	2	2	4
P 1	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 50 to 59

N=	50	51	52	53	54	55	56	57	58	59	=N
P99	50	50	51	52	53	54	55	56	57	58	P99
96	48	49	50	51	52	53	54	55	56	57	96
90	45	46	47	48	49	50	50	51	52	53	90
80	40	41	42	42	43	44	45	46	46	47	80
75	38	38	39	40	41	41	42	43	44	44	75
70	35	36	36	37	38	39	39	40	41	41	70
65	33	33	34	34	35	36	36	37	38	38	65
60	30	31	31	32	32	33	34	34	35	35	60
50	25	26	26	27	27	28	28	29	29	30	50
40	20	20	21	21	22	22	22	23	23	24	40
35	18	18	18	19	19	19	20	20	20	21	35
30	15	15	16	16	16	17	17	17	17	18	30
25	13	13	13	13	14	14	14	14	15	15	25
20	10	10	10	11	11	11	11	11	12	12	20
10	5	5	5	5	5	6	6	6	6	6	10
4	2	2	2	2	2	2	2	2	2	2	4
P 1	.5	.5	.5	.5	.5	.6	.6	.6	.6	.6	P 1

TABLES 60 to 69

N=	60	61	62	63	64	65	66	67	68	69	=N
P99	59	60	61	62	63	64	65	66	67	68	P99
96	58	59	60	61	61	62	63	64	65	66	96
90	54	55	56	57	58	59	59	60	61	62	90
80	48	49	50	51	51	52	53	54	54	55	80
75	45	46	47	47	48	49	50	50	51	52	75
70	42	43	43	44	45	46	46	47	48	48	70
65	39	40	40	41	42	42	43	44	44	45	65
60	36	37	37	38	38	39	40	40	41	41	60
50	30	31	31	32	32	33	33	34	34	35	50
40	24	24	25	25	26	26	26	27	27	28	40
35	21	21	22	22	22	23	23	23	24	24	35
30	18	18	19	19	19	20	20	20	20	21	30
25	15	15	16	16	16	16	17	17	17	17	25
20	12	12	12	13	13	13	13	13	14	14	20
10	6	6	6	6	6	7	7	7	7	7	10
4	2	2	2	3	3	3	3	3	3	3	4
P 1	.6	.6	.6	.6	.6	.7	.7	.7	.7	.7	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 70 to 79

N=	70	71	72	73	74	75	76	77	78	79	=N
P99	69	70	71	72	73	74	75	76	77	78	P99
96	67	68	69	70	71	72	73	74	75	76	96
90	63	64	65	66	67	68	68	69	70	71	90
80	56	57	58	58	59	60	61	62	62	63	80
75	53	53	54	55	56	56	57	58	59	59	75
70	49	50	50	51	52	53	53	54	55	55	70
65	46	46	47	47	48	49	49	50	51	51	65
60	42	43	43	44	44	45	46	46	47	47	60
50	35	36	36	37	37	38	38	39	39	40	50
40	28	28	29	29	30	30	30	31	31	32	40
35	25	25	25	26	26	26	27	27	27	28	35
30	21	21	22	22	22	23	23	23	23	24	30
25	18	18	18	18	19	19	19	19	20	20	25
20	14	14	14	15	15	15	15	15	16	16	20
10	7	7	7	7	7	8	8	8	8	8	10
4	3	3	3	3	3	3	3	3	3	3	4
P 1	.7	.7	.7	.7	.7	.8	.8	.8	.8	.8	1

TABLES 80 to 89

N=	80	81	82	83	84	85	86	87	88	89	=N
P99	79	80	81	82	83	84	85	86	87	88	P99
96	77	78	79	80	81	82	83	84	85	86	96
90	72	73	74	75	76	77	77	78	79	80	90
80	64	65	66	66	67	68	69	70	70	71	80
75	60	61	62	62	63	64	65	65	66	67	75
70	56	57	57	58	59	60	60	61	62	62	70
65	52	53	53	54	55	55	56	57	57	58	65
60	48	49	49	50	50	51	52	52	53	53	60
50	40	41	41	42	42	43	43	44	44	45	50
40	32	32	33	33	34	34	34	35	35	36	40
35	28	28	29	29	29	30	30	30	31	31	35
30	24	24	25	25	25	26	26	26	26	27	30
25	20	20	21	21	21	21	22	22	22	22	25
20	16	16	16	17	17	17	17	17	18	18	20
10	8	8	8	8	8	9	9	9	9	9	10
4	3	3	3	3	3	3	3	3	4	4	4
P 1	.8	.8	.8	.8	.8	.9	.9	.9	.9	.9	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 90 to 99

N=	90	91	92	93	94	95	96	97	98	99	=N
P99	89	90	91	92	93	94	95	96	97	98	P99
96	86	87	88	89	90	91	92	93	94	95	96
90	81	82	83	84	85	86	86	87	88	89	90
80	72	73	74	74	75	76	77	78	78	79	80
75	68	68	69	70	71	71	72	73	74	74	75
70	63	64	64	65	66	67	67	68	69	69	70
65	59	59	60	60	61	62	62	63	64	64	65
60	54	55	55	56	56	57	58	58	59	59	60
50	45	46	46	47	47	48	48	49	49	50	50
40	36	36	37	37	38	38	38	39	39	40	40
35	32	32	32	33	33	33	34	34	34	35	35
30	27	27	28	28	28	29	29	29	29	30	30
25	23	23	23	23	24	24	24	24	25	25	25
20	18	18	18	19	19	19	19	19	20	20	20
10	9	9	9	9	9	10	10	10	10	10	10
4	4	4	4	4	4	4	4	4	4	4	4
P 1	.9	.9	.9	.9	.9	1.0	1.0	1.0	1.0	1.0	P 1

TABLES 100 to 109

N=	100	101	102	103	104	105	106	107	108	109	=N
P99	99	100	101	102	103	104	105	106	107	108	P99
96	96	97	98	99	100	101	102	103	104	105	96
90	90	91	92	93	94	95	95	96	97	98	90
80	80	81	82	82	83	84	85	86	86	87	80
75	75	76	77	78	78	79	80	80	81	82	75
70	70	71	71	72	73	74	74	75	76	76	70
65	65	66	66	67	68	68	69	70	70	71	65
60	60	61	61	62	62	63	64	64	65	65	60
50	50	51	51	52	52	53	53	54	54	55	50
40	40	40	41	41	42	42	42	43	43	44	40
35	35	35	36	36	36	37	37	37	38	38	35
30	30	30	31	31	31	32	32	32	32	33	30
25	25	25	26	26	26	26	27	27	27	27	25
20	20	20	20	21	21	21	21	21	22	22	20
10	10	10	10	10	10	11	11	11	11	11	10
4	4	4	4	4	4	4	4	4	4	4	4
P 1	1.0	1.0	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 110 to 119

N=	110	111	112	113	114	115	116	117	118	119	=N
P99	109	110	111	112	113	114	115	116	117	118	P99
96	106	107	108	108	109	110	111	112	113	114	96
90	99	100	101	102	103	104	104	105	106	107	90
80	88	89	90	90	91	92	93	94	94	95	80
75	83	83	84	85	86	86	87	88	89	89	75
70	77	78	78	79	80	81	81	82	83	83	70
65	72	72	73	73	74	75	75	76	77	78	65
60	66	67	67	68	68	69	70	70	71	71	60
50	55	56	56	57	57	58	58	59	59	60	50
40	44	44	45	45	46	46	46	47	47	48	40
35	39	39	39	40	40	40	41	41	41	42	35
30	33	33	34	34	34	35	35	35	35	36	30
25	28	28	28	28	29	29	29	29	30	30	25
20	22	22	22	23	23	23	23	23	24	24	20
10	11	11	11	11	11	12	12	12	12	12	10
4	4	4	4	5	5	5	5	5	5	5	4
P 1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2	1.2	P 1

TABLES 120 to 129

N=	120	121	122	123	124	125	126	227	128	129	=N
P99	119	120	121	122	123	124	125	126	127	128	P99
96	115	116	117	118	119	120	121	122	123	124	96
90	108	109	110	111	112	113	113	114	115	116	90
80	96	97	98	98	99	100	101	102	102	103	80
75	90	91	92	92	93	94	95	95	96	97	75
70	84	85	85	86	87	88	88	89	90	90	70
65	78	79	79	80	81	81	82	83	83	84	65
60	72	73	73	74	74	75	76	77	77	77	60
50	60	61	61	62	62	63	63	64	64	65	50
40	48	49	49	49	50	50	50	51	51	52	40
35	42	42	43	43	43	44	44	44	45	45	35
30	36	36	37	37	37	38	38	38	38	39	30
25	30	30	31	31	31	31	32	32	32	32	25
20	24	24	24	25	25	25	25	25	26	26	20
10	12	12	12	12	12	13	13	13	13	13	10
4	5	5	5	5	5	5	5	5	5	5	4
P 1	1.2	1.2	1.2	1.2	1.2	1.3	1.3	1.3	1.3	1.3	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 130 to 139

N=	130	131	132	133	134	135	136	137	138	139	=N
P99	129	130	131	132	133	134	135	136	137	137	P99
96	125	126	127	128	129	130	131	132	132	133	96
90	117	118	119	120	121	122	122	123	124	125	90
80	104	105	106	106	107	108	109	110	110	111	80
75	98	98	99	100	101	101	102	103	104	104	75
70	91	92	92	93	94	95	95	96	97	97	70
65	85	85	86	86	87	88	88	89	90	90	65
60	78	79	79	80	80	81	82	82	83	83	60
50	65	66	66	67	67	68	68	69	69	70	50
40	52	52	53	53	54	54	54	55	55	56	40
35	46	46	46	47	47	47	48	48	48	49	35
30	39	39	40	40	40	41	41	41	41	42	30
25	33	33	33	33	34	34	34	34	35	35	25
20	26	26	26	27	27	27	27	27	28	29	20
10	13	13	13	13	13	14	14	14	14	14	10
4	5	5	5	5	5	5	5	5	6	6	4
P 1	1.3	1.3	1.3	1.3	1.3	1.4	1.4	1.4	1.4	1.4	P 1

TABLES 140 to 149

N=	140	141	142	143	144	145	146	147	148	149	=N
P99	139	140	141	142	143	144	145	146	147	148	P99
96	134	135	136	137	138	139	140	141	142	143	96
90	126	127	128	129	130	131	131	132	133	134	90
80	112	113	114	114	115	116	117	118	118	119	80
75	105	106	107	107	108	109	110	110	111	112	75
70	98	99	99	100	101	102	102	103	104	104	70
65	91	92	92	93	94	94	95	96	96	97	65
60	84	85	85	86	86	87	88	88	89	89	60
50	70	71	71	72	72	73	73	74	74	75	50
40	56	56	57	57	58	58	58	59	59	60	40
35	48	49	50	50	50	51	51	51	52	52	35
30	42	42	43	43	43	44	44	44	44	45	30
25	35	35	36	36	36	36	37	37	37	37	25
20	28	28	28	29	29	29	29	29	30	30	20
10	14	14	14	14	14	15	15	15	15	15	10
4	6	6	6	6	6	6	6	6	6	6	4
P 1	1.4	1.4	1.4	1.4	1.4	1.5	1.5	1.5	1.5	1.5	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 150 to 159

N=	150	151	152	153	154	155	156	157	158	159	=N
P99	149	149	150	151	152	153	154	155	156	157	P99
96	144	145	146	147	148	149	150	151	152	153	96
90	135	136	137	138	139	140	140	141	142	143	90
80	120	121	122	122	123	124	125	126	126	127	80
75	113	113	114	115	116	116	117	118	119	119	75
70	105	105	106	107	108	109	109	110	111	111	70
65	98	98	99	99	100	101	101	102	103	103	65
60	90	91	91	92	92	93	94	94	95	95	60
50	75	76	76	77	77	78	78	79	79	80	50
40	60	60	61	61	62	62	62	63	63	64	40
35	53	53	53	54	54	55	55	55	55	56	35
30	45	45	46	46	46	47	47	47	47	48	30
25	38	38	38	38	39	39	39	39	40	40	25
20	30	30	30	31	31	31	31	31	32	32	20
10	15	15	15	15	15	16	16	16	16	16	10
4	6	,6	6	,6	6	6	,6	6	6	6	4
P 1	1.5	1.5	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	P 1

TABLES 160 to 169

N=	160	161	162	163	164	165	166	167	168	169	=N
P99	158	159	160	161	162	163	164	165	166	167	P99
96	154	155	156	156	157	158	159	160	161	162	96
90	144	145	146	147	148	149	149	150	151	152	90
80	128	128	130	130	131	132	133	134	134	135	80
75	120	121	122	122	123	124	125	125	126	127	75
70	112	113	113	114	115	116	116	117	118	118	70
65	104	105	105	106	107	107	108	109	109	110	65
60	96	97	97	98	98	99	100	100	101	101	60
50	80	81	81	82	82	83	83	84	84	85	50
40	64	64	65	65	66	66	66	67	67	68	40
35	56	56	57	57	57	58	58	58	59	59	35
30	48	48	49	49	49	50	50	50	50	51	30
25	40	40	41	41	41	41	42	42	42	42	25
20	32	32	33	33	33	33	33	33	34	34	20
10	16	16	16	16	16	17	17	17	17	17	10
4	6	6	6	7	7	7	7	7	7	7	4
P 1	1.6	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 170 to 179

N=	170	171	172	173	174	175	176	177	178	179	=N
P99	168	169	170	171	172	173	174	175	176	177	P99
96	163	164	165	166	167	168	169	170	171	172	96
90	153	154	155	156	157	158	158	159	160	161	90
80	136	137	138	138	139	140	141	142	142	143	80
75	128	128	129	130	131	131	132	133	134	134	75
70	119	120	120	121	122	123	123	124	125	125	70
65	111	111	112	112	113	114	114	115	116	116	65
60	102	103	103	104	104	105	106	106	107	107	60
50	85	86	86	87	87	88	88	89	89	90	50
40	68	68	69	69	70	70	70	71	71	72	40
35	60	60	60	61	61	61	62	62	62	63	35
30	51	51	52	52	52	53	53	53	53	54	30
25	43	43	43	43	44	44	44	44	45	45	25
20	34	34	34	35	35	35	35	35	36	36	20
10	17	17	17	17	17	17	18	18	18	18	10
4	7	7	7	7	7	7	7	7	7	7	4
P 1	1.7	1.7	1.7	1.7	1.7	1.8	1.8	1.8	1.8	1.8	P 1

TABLES 180 to 189

N=	180	181	182	183	184	185	186	187	188	189	=N
P99	178	179	180	181	182	183	184	185	186	187	P99
96	173	174	175	176	177	178	179	180	180	181	96
90	162	163	164	165	166	167	167	168	169	170	90
80	144	145	146	146	147	148	149	150	150	151	80
75	135	136	137	137	138	139	140	140	141	142	75
70	126	127	127	128	129	130	130	131	132	132	70
65	117	118	118	119	120	121	121	122	122	123	65
60	108	109	109	110	110	111	112	112	113	113	60
50	90	91	91	92	92	93	93	94	94	95	50
40	72	72	73	73	74	74	74	75	75	76	40
35	63	63	64	64	64	65	65	65	66	66	35
30	54	54	55	55	55	56	56	56	56	57	30
25	45	45	46	46	46	46	47	47	47	47	25
20	36	36	36	37	37	37	37	37	38	38	20
10	18	18	18	18	18	19	19	19	19	19	10
4	7	7	7	7	7	7	7	7	8	8	4
P 1	1.8	1.8	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	P 1

APPENDIX 15 (Continued)

DETERMINING THE PERCENTAGE OF CASES SOUGHT

TABLES 190 to 199

N=	190	191	192	193	194	195	196	197	198	199	=N
P99	188	189	190	191	192	193	194	195	196	197	P99
96	182	183	184	185	186	187	188	189	190	191	96
90	171	172	173	174	175	176	176	177	178	179	90
80	152	153	154	154	155	156	157	158	158	159	80
75	143	143	144	145	146	146	147	148	149	149	75
70	133	134	134	135	136	137	137	138	139	139	70
65	124	124	125	125	126	127	127	128	129	129	65
60	114	115	115	116	116	117	118	118	119	119	60
50	95	96	96	97	97	98	98	99	99	100	50
40	76	76	77	77	78	78	78	79	79	80	40
35	67	67	67	68	68	68	69	69	69	70	35
30	57	57	58	58	58	59	59	59	59	60	30
25	48	48	48	48	49	49	49	49	50	50	25
20	38	38	38	39	39	39	39	39	40	40	20
10	19	19	19	19	19	20	20	20	20	20	10
4	8	8	8	8	8	8	8	8	8	8	4
P 1	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0	2.0	P 1

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[1] Please change the definition of a learning disability on page 151 to the following: one who has a specific difficulty in one or more basic learning processes but who apparently has normal or near-normal intelligence.

PROJECT
TITLE III
ESEA
ACTIVE